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Agricultural Research Service
Crops Research Division
Vegetables and Ornamentals Research Branch
Potato Investigations
Beltsville, Maryland

THE NATIONAL POTATO-BREEDING PROGRAM, 1969

By
Raymon E. Webb and Others
and
State Cooperators

(Fortieth Annual Report to Cooperators)
Plant Industry Station
Beltsville, Maryland

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This progress report includes tentative results of research not sufficiently complete to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Therefore, this report is not intended for publication and should not be referred to in literature citations.

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TABLE OF CONTENTS

	<u>Page</u>
UNITED STATES DEPARTMENT OF AGRICULTURE:	
Plant Industry Station, Beltsville, Md., and Chapman and Aroostook Farms, Presque Isle, Maine -----	1
By R. E. Webb, USDA, Beltsville, Md.; David Wilson, Eugene Emsweller, Robert Young, Robert Goth, Lind Sanford, Muriel J. O'Brien, Gilbert McCollum, and Stephen Sinden, USDA, Beltsville, Md.	
Distribution -----	1
Chapman Farm -----	3
Aroostook Farm -----	6
Potato Disease Investigations -----	12
By R. J. Young, R. W. Goth, Muriel J. O'Brien, and S. L. Sinden, USDA, Beltsville, Md.	
Common Scab and Verticillium wilt Resistance -----	12
Early Blight -----	13
Late Blight -----	13
Virus Diseases -----	14
Resistance to Leafroll -----	14
Net Necrosis, Virus A, and Multiple Disease -----	15
Inter-Regional Potato Introduction Project -----	19
By R. W. Ross and P. R. Rowe, Wisc. Agr. Exp. Sta., Madison, Wisc.	
North Central Regional Trial -----	21
By R. H. Johansen, N. D. Agr. Exp. Sta., Fargo, N. D., and Cooperators	
Environmental Conditions -----	21
Cultural Practices -----	21
Entries -----	22
Yields -----	22
Maturity -----	22
Total Solids -----	22
Scab Reaction -----	22
Internal and External Defects -----	22
Overall Merit Ratings -----	23
Pacific Northwest -----	31
By J. J. Pavek and Dexter R. Douglas, Branch Exp. Sta., Aberdeen, Idaho	
Yield Trials -----	31
Disease Evaluations -----	33
Distribution -----	35
ALABAMA -----	45
By Sam T. Jones (deceased), J. L. Turner, and Hubert Harris, Ala. Agr. Exp. Sta., Auburn, Ala., Harold Yates, J. E. Barrett, and Frank Garrett, Gulf Coast Substation, Fairhope, Ala.	

	<u>Page</u>
ALASKA -----	47
By C. H. Dearborn, Univ. of Alaska, Palmer, Alaska	
CANADA -----	58
By G. R. Johnston, Ontario Agr. College, Guelph	
Regional and Adaptation Trials -----	58
Culinary Ratings -----	60
Discussion of Potato Cultivars -----	70
COLORADO -----	72
By J. A. Twomey, San Luis Valley Branch Station, Center, Colo.	
Seedling Program -----	72
Yield Trial -----	72
CONNECTICUT -----	75
By Arthur Hawkins, Univ. of Connecticut, Storrs, Conn.	
Varieties, Yields, Specific Gravity, Chipping, Tuber Observations ----	75
DELAWARE -----	80
By E. P. Brasher, Del. Agr. Exp. Sta., Newark, Del.	
ICELAND -----	81
By E. I. Siggeirsson, Reyhjavik, Iceland	
INDIANA -----	83
By C. M. Jones, Ind. Agr. Exp. Sta., Purdue Univ., Lafayette, Ind.	
MAINE -----	84
By Hugh J. Murphy, Maine Sta., David R. Wilson, Presque Isle, Maine, and Michael J. Goven, Maine Sta., Orono, Maine	
By Donald Merriam, F. E. Manzer, and R. V. Akeley, Maine Agr. Exp. Sta., Orono, Maine	
Ring Rot Resistant Seedlings -----	90
Spindle Tuber Resistant Seedlings -----	91
MARYLAND -----	92
By J. G. Kantzes and H. K. Nicholson, Univ. of Maryland, College Park, Md.	
MICHIGAN -----	94
By N. R. Thompson and R. W. Chase, Univ. of Mich. Agr. Exp. Sta., East Lansing, Mich.	
Overstate Yield and Quality Trial -----	95
MINNESOTA -----	97
By Orrin C. Turnquist, F. I. Lauer, A. Quisenberry, and E. B. Radcliffe, Minn. Agr. Exp. Sta., St. Paul, Minn.	
Variety Demonstrations -----	98
Spacing Trial -----	107
Aphid Resistance -----	108

	<u>Page</u>
NEW JERSEY -----	112
By John C. Campbell, N. J. Agr. Exp. Sta., New Brunswick, N. J.	
Rutgers' Farm -----	112
George Coombs' Farm -----	112
George Rue Farm -----	113
NEW YORK -----	117
By S. Dallyn, P. Schippers, and D. Fricke, Long Island Veg. Res. Farm, Riverhead, N. Y.	
Variety Trials -----	117
By R. C. Cetas, Cornell Agr. Exp. Sta., Ithaca, N. Y.	
Evaluation of Varieties and Breeding Lines Resistant to Verticillium wilt -----	127
Materials and Methods -----	127
Results -----	128
By R. L. Plaisted and L. C. Peterson, Cornell Agr. Exp. Sta., Ithaca, N. Y.	131
By J. B. Sieczka and E. E. Ewing, Cornell Agr. Exp. Sta., Ithaca, N.Y.	138
NORTH CAROLINA -----	145
By F. L. Haynes, North Carolina Agr. Exp. Sta., Raleigh, N. C.	
NORTH DAKOTA -----	146
By R. H. Johansen and J. E. Huguelet, N. D. Agr. Exp. Sta., Fargo, N.D.	
Potato Crossing Program -----	146
Greenhouse and Field Seedlings -----	146
Advanced Selections -----	146
Processing Trials -----	147
Culinary Tests -----	147
Promising Selections -----	147
Variety Trials -----	148
Disease Testing -----	150
OHIO -----	164
By Floyd Lower, Ohio Agr. Exp. Sta., Wooster, Ohio	
PENNSYLVANIA -----	169
By C. S. Bryner, Elmer C. Pifer, and M. Henninger, Ps. Agr. Exp. Sta., Univ. Park, Pa.	
Cultural Information and Rainfall -----	169
Specific Gravity Determinations -----	171
Results of Demonstration -----	171
By J. D. Harrington and F. J. McArdle -----	173
RHODE ISLAND -----	178
By Robert S. Bell, R. I. Agr. Exp. Sta., Kingston, R. I.	

	<u>Page</u>
SOUTH CAROLINA -----	179
By W. R. Sitterly, Agr. Exp. Sta., Clemson, S. C.	
TENNESSEE -----	180
By C. A. Mullins, H. D. Swingle, and I. E. McCarty, Tennessee Agr. Exp. Sta., Knoxville, Tenn.	
TEXAS -----	182
By B. A. Perry, M. C. Fuqua, S. D. Cotner, Texas Agr. Exp. Sta., College Sta., Texas, R. E. Webb, USDA, Beltsville, Md.	
Screening and Evaluation of Varieties and Seedlings -----	182
By R. D. Peel, Paris, Texas, C. E. Cunningham and R. L. Nickeson, Riverton, N. J.	
Cooperative Testing of Potato Varieties for Use in Soups ----	184
VERMONT -----	189
By Wilfred R. Kelly, Richard Jensen, Kenneth Atwood, Samuel C. Wiggans, Montpelier, Vt., and Hugh Murphy, Univ. of Maine, Orono, Maine	
VIRGINIA -----	193
By Boyett Graves, Va. Truck Exp. Sta., Norfolk, Va.	
WASHINGTON -----	196
By Wm. G. Hoyman, Irrigation Exp. Sta., Prosser, Washington	
Distribution -----	196
Early and Late Harvest Trials -----	196
Selections -----	197
By N. Holstad, R. Kunkel, and R. C. Holland, Agr. Exp. Sta. Pullman, Wash.	
Variety Trials -----	203
WISCONSIN -----	205
By P. R. Rowe, Wisc. Agr. Exp. Sta., Madison, Wisc.	
Genetics and Cytogenetics of Tuber-Bearing <u>Solanum</u> Species -----	205
WYOMING -----	207
By K. E. Bohnenblust and G. S. Howard, Agr. Exp. Sta., Laramie, Wyo.	
	207

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PRECAUTIONS

This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife--if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

PLANT INDUSTRY STATION (Beltsville, Md.) and
CHAPMAN AND AROOSTOOK FARMS (Presque Isle, Maine)
R. E. Webb, David Wilson, Eugene Emsweller, Robert Young, Robert Goth,
Lind Sanford, Muriel J. O'Brien, Gilbert McCollum, and Stephen Sinden

Distribution

Summaries of seed, seedling tubers, clonal lines, and named varieties shipped to foreign countries and cooperating states are given in tables 1, 2, and 3. One hundred and ninety-one lots of named varieties, 118 advanced selections, 4013 seedling tubers and over 42,000 true seed were sent to interested parties in 26 foreign countries (table 1). One hundred and twenty-three lots of named varieties and 432 advanced selections were sent to 28 cooperators in 19 states (table 2). Three hundred and ninety progenies comprising 67,010 seedling tubers and 37,931 or more true seed were distributed from Beltsville to 5 cooperators in the United States (table 3).

P.I. table 1. Distribution of potato varieties, advanced selections, seedling tubers and true seed to foreign countries, 1969.

Country	Cooperator	Varieties	Select-ions	Seedling tubers	True seed
Australia	Ray J. Jessup		5		10,850
	J. M. Harvey	1			
	J. H. Ballard	3			
Canada	G. R. Johnston		14		
	J. P. McKennon		4		
	H. Genereux	4	8		
Ceylon	C. R. DeVoz				5,100
Congo	L. H. Rasmussen	2	2		
El Salvador	Julio Cruz	8			
England	H. A. S. Epton	3			
Ethiopia	H. Michael K. M.	7	12		
Finland	Request by H. Hyland	1			
France	M. Masson	4	6		
	B. Zinkweg	1			
	Director IVRO	6			
Holland	Request by H. Hyland	7	3		
	J. A. H. Esch	1			
	C. Mastenbroek	4	2		
India	Pushkarnath	3	5		
	Hari Kishore	21			
	Geuting	9	1		
Iran	G. Scharif	2	4		
	M. Mackarechian	11	1		
	E. Esfandiari	2	4		

continued

P.I. table 1 continued.

Israel	M. Susnoschi	1	7		
Korea	L. A. Gattoni	16	3		
Malawi	W. T. H. Peregrine	13			
Newfoundland	K. G. Proudfoot	3	17		
Nigeria	K. Kopf			4013	
New Zealand	R. G. Robinson	3			
Romania	Request by H. Hyland	7			
Russia	" " "	8			
Spain	" " "	23	16		
South Africa	Request by H. Fisher	4			
Sweden	T. Denward	1			
Tonga	J. S. Speir	10			
Uganda	R. Wurster				26,335
Yugoslavia	Olga Klindic	<u>2</u>	<u>4</u>	<u> </u>	<u> </u>
Totals		191	118	4013	42,285

P.I. table 2. Distribution of varieties and advanced selections to states,
1969¹

State	Cooperator	Varities	Selections
Alabama	Sam T. Jones	3	6
Alaska	Curtis H. Dearborne		177
California	Glenn Davis	8	6
Colorado	J. A. Twomey		3
Connecticut	Saul Rich	8	
	Arthur Hawkins	11	2
Delaware	Gene Brasher	5	17
Florida	J. R. Shumaker	13	13
Idaho	J. J. Pavcek		4
	M. D. Groskopp	1	
Maryland	H. H. Heggstead	8	
	J. G. Kantzes	9	3
	J. M. Yeatman	3	
Minnesota	G. R. Klacan		2
	O. C. Turnquist		1
New Jersey	John C. Campbell	8	42
New York	Robert Cetas	6	18
	L. C. Peterson		28
	J. B. Sieczka	13	14
	D. H. Fricke	2	12
North Dakota	Robert Ekie	1	
Ohio	Floyd Lower	2	2
	J. P. Slesman	4	33
Rhode Island	R. S. Bell	4	10

continued

P.I. table 2 continued.

South Carolina	W. R. Sitterly	3	7
Texas	Bruce Perry	5	13
Washington	Wm. G. Hoyman		10
Wisconsin	Martin Cipar	<u>6</u>	<u>23</u>
Totals		123	432

1/ Table may be incomplete.

P.I. table 3. Distribution of first-year seedling tubers and true seed from the Beltsville program, 1969.

State	Cooperator	Progenies	Seedlings	Seed
		No.	No.	No.
Colorado	James A. Twomey	109	15,561	
Maine	David Wilson	103	40,896	
	Robert Akeley	110		27,786
North Carolina	Frank Haynes	19	5,544	
		20		10,145
Wisconsin	Martin Cipar	<u>29</u>	<u>5,009</u>	
Totals		390	67,010	37,931

Chapman Farm

Approximately 48,000 seedlings representing 215 parental combinations and inbreds from Beltsville and Riverton, New Jersey were planted on Chapman Farm. From these about 1500 selections were made for observation in 12-hill lots in 1970.

A summary of the maturity and fertility of 1346 selections grown in 12-hill lots during the 1969 season is given in P.I. table 4. Cobbler (early) Chippewa (medium) and Green Mountain (late) growing at another location but planted at the same time were used as controls for maturity determinations.

P.I. table 4. Maturity and fertility of seedlings grown in 12-hill rows, in 1969.

Maturity Classes	Seedling		Fertility Classes	Seedling	
	No.	Pct.		No.	Pct.
Early	488	36.3	None	594	44.1
Medium	413	30.7	Slight	129	9.6
Late	<u>445</u>	33.0	Good	<u>623</u>	46.3
Total	1346			1346	

From the 1346 seedling selections 419 were selected to be grown in the 60-hill increase plots for an evaluation of yield, tuber characteristics, specific gravity, and processing qualities in 1970.

Three tuber-unit virus-indexed plots were grown on 6-foot rows in 1969. Twenty-seven entries were from 1968 virus X, S, and M-free plots, 51 were from the X and M-free plots and 56 were from the 1968 sixty-hill increase stocks. Specimens were collected from plants of each unit of each entry and tested serologically against the specific antiserum. Of the 134 entries tested, numerous units of 100 entries appeared virus free and were harvested for further evaluation and tests.

About 178 seedlings were grown for increase in 60-hill plots and were evaluated for tuber characteristics, specific gravity and processing qualities. Specific gravity ranged from 1.051 - 1.095 (about 6" rainfall just prior to harvest) and chip quality ranged from 3.0 - 10.0 when reconditioned at 70° F. following 3 months' storage at 50° F.

Golden Nematode Resistance: Sixty-one selections from the 12-hill series were collected by Dr. Peterson and screened by associates for reaction to the golden nematode. Twenty-eight selections proved resistant. Table 5 lists the resistant selections, parentage and some of the tuber characteristics and processing qualities. Most of the entries have been advanced to the preliminary yield trials and the more promising ones will be available for distribution this season.

P.I. table 5. Golden nematode resistance. Selections evaluated and found resistant in 1968-69 by Dr. L. C. Peterson and co-workers, Cornell University, Ithaca, N. Y.

Pedigree	Parentage	1/	Specific Gravity	Maturity	2/	3/
		General Appearance			Chip	French Fry
B6731-3	B1625-12 x B5281-1	4	1.069	ML	8.0	3.0
B6741-2	B4523-8 x B4537-8	3+	1.066	ML	8.0	3.0
" -3	" "	3	1.064	M	8.0	2.0
" -11	" "	3+		L		
" -16	" "	3+	1.052	ML	10.0	5.0
" -22	" "	3	1.060	L	8.0	3.0
" -23	" "	3	1.061	L	9.0	3.0
B6743-3	" x B5598-2	4	1.055	ML	10.0	4.0
B6746-5	B4557-2 x Merrimack	2+		L		
B6748-9	" x B4537-8	3		L		
B6750-3	" x B5000-18	3-	1.054	L	10.0	5.0
" -11	" x "	3	1.059	L	10.0	5.0
B6751-3	" x B5598-2	3	1.062	L	10.0	4.0
" -13	" x "	4	1.064	ML	9.0	3.2
B6797-2	B5690-5 x B5281-1	2+	1.062	L	10.0	3.0
B6799-1	B5716-5 x "	4	1.067	M	10.0	4.0
B6806-1	B5755-8 x B3139-24	-	-	-	-	-
B6815-22	" x B5598-2	-	-	-	-	-

continued

P.I. table 5 continued.

BR5820-26	Wauseon x B3819-17	4	-	ME	-	-
" -29	" x "	4	-	ML	-	-
BR6822-5	" x B5088-21	3+	-	ML	-	-
BR6862-2	" x B5042-2	4	-	ML	-	-
BR6863-2	" x B5141-6	3+	-	ML	-	-
" -3	" x "	3+	-	L	-	-
B6879-5	" x B5000-18	3+	1.070	L	9.0	4.0
" -11	" x "	3+	1.064	L	8.4	3.4
B6887-6	B5288-5 x B5421-3	4+	1.062	L	10.0	3.6
BR6900-2	B5461-4 x Cherokee	3+	-	L	-	-

1/ See footnotes table 6.

Aroostook Farm

The experimental design for all yield tests conducted on Aroostook Farm during 1969 was a randomized complete block design with five replications. All plots received 1200 pounds of 10-15-15 fertilizer banded in 3⁴-inch rows by a two-row planter. The seedlings to be tested were hand planted in 20-hill rows with 10-inch spacing. During the growing season cultural methods for weed, insect and disease control were conducted according to local recommendations. Most of the seedlings in the early, medium and late maturity yield tests were screened for resistance to five different viruses, scab, Verticillium wilt, early and late blight, rhizoctonia and ring rot during the 1969 growing season.

Early Maturity Yield Test. Eleven numbered seedlings and the varieties Norgold Russet and Irish Cobbler were planted on May 15, 1969 (P.I. table 6). After a growing season of 100 days plots were quick-killed on August 25 and harvested on September 2, 1969. Two seedlings, BR6448-7 and BR6617-2, significantly outyielded Irish Cobbler. All entries tested with the exception of B6518-2 outyielded Norgold Russet.

Eight of the seedlings tested ranged from 90-98 percent of yield above 2 inches. B6518-2 exhibited a size problem at the 10-inch spacing.

The specific gravity of all entries was relatively low. Irish Cobbler had the highest specific gravity, 1.077. One seedling, B6518-2 was in the same range as Norgold Russet and Irish Cobbler. All others were significantly lower than Norgold Russet.

Tuber ratings of all seedlings were superior to Irish Cobbler. Four seedlings, B6529-12, B6547-7, B6558-16, B6573-11 and Norgold Russet had outstanding tuber ratings.

A chip color rating of less than 7.0 is considered commercially acceptable. Chips made from Irish Cobbler after four months of constant 50° F. storage were rated 7.8. Three seedlings had lower ratings than Irish Cobbler but none were acceptable by the above standards. No entry produced acceptable chips after frying from any of the three storage treatments.

French fry samples taken from constant 50° F. storage were rated for color and texture. A rating of 3.0 or less was considered acceptable. Three seedlings, B6518-2, B6529-12, and B6558-16 made acceptable french fries as determined by color ratings and texture evaluations.

P.I. table 6. Early maturity yield test, Aroostook Farm, Presque Isle, Maine, 1969.

Variety Seedlings Tested	Yield Per Acre Over 2"		<u>1/</u> Specific Gravity	<u>2/</u> Tuber Rating	<u>3/</u> Chip Rating			<u>4/</u> French Fry Color	<u>5/</u> Tex.
					40°F.	50°F.	40-70°F.		
	Cwt.	Pct.							
BR6448-7	376	97	63	3	10.0	9.1	9.5	3.5	M
Norgold Russet	231	79	74	4	10.0	9.5	10.0	4.0	I
B6518-2	238	79	76	3	9.4	7.2	8.1	2.0	M
B6519-3	279	92	61	3	10.0	10.0	10.0	4.5	I
B6529-12	332	96	64	4	10.0	7.7	8.5	2.5	I
B6535-10	315	89	60	3	10.0	9.6	10.0	4.2	S
B6547-7	300	98	62	4	10.0	8.6	9.5	3.1	S
B6558-16	309	88	66	4	10.0	7.5	10.0	2.5	M
B6573-11	341	90	61	4	10.0	10.0	10.0	5.0	I
B6597-20	293	93	62	3+	10.0	10.0	10.0	4.0	I
B6599-1	300	92	67	3	10.0	9.1	10.0	3.8	I
BR6617-2	375	96	58	3+	10.0	10.0	10.0	3.5	S
Irish Cobbler	331	91	77	3-	10.0	7.8	9.0	3.5	I
L.S.D. 5%	39.1		05			1.1	0.6	1.3	

1/ 1.0 omitted from all ratings - Mean of two replications

2/ 1 = poor to 5 = excellent

3/ After 4 months of storage at 40°, 50°, and reconditioning 40°-70°F. for 14 days;
1 - light; to 10 - very dark; 7 or less acceptable; 40° readings taken in one
replication only.

4/ 50° storage 1 light to 5 very dark; 3 or less acceptable.

5/ I - intermediate S - soggy M - mealy I - M acceptable - two replications

Medium Maturity Yield Test. Twenty-eight numbered seedlings and two varieties, Alamo and Chippewa were planted in the medium maturity yield test (P.I. table 7). All entries were planted on May 15, 1969 and quick-killed on September 2, 1969, allowing a growing season of 110 days. Plots were harvested on September 12, 1969.

Two seedlings, B6534-2 and B6545-20 produced significantly higher yields than Chippewa. Nine entries produced lower yields than the check variety. In percent yield over 2 inches in size, twenty-one of the numbered seedlings ranged from 90-97 percent. Seven seedlings produced yields with less than 90 percent primes.

Specific gravities for Alamo and Chippewa were 1.066 and 1.068 respectively. Eighteen of the numbered seedlings were significantly higher in specific gravity than Chippewa. One seedling B6573-25 was significantly lower in specific gravity than Chippewa.

Tuber appearance ratings of eight seedlings were less than the ratings of the check varieties. Five of the entries were rated as outstanding in appearance.

Chip color of all entries was commercially unacceptable when fried directly from four months of 40° F. storage. When fried from four months of 50° F. storage the chips of eight numbered seedlings had ratings of 7.0 or lower. Seedlings producing acceptable chips from 50° F. storage were BR6273-1, B6518-5, B6562-14, B6564-9, B6564-27, B6595-12, B6603-12 and BR6609-7. The lightest chips were made from B6564-27, B6595-12 and B6603-12. When tubers were stored for four months at 40° F. and reconditioned for 14 days at 70° F. before frying only these three seedlings produced acceptable chips. Seedling B6595-12, the best chipper in the test, exhibited the lowest yield of the seedlings tested.

Entries were screened for french fry color and texture after four months of 50° F. storage. Nine seedlings produced acceptable french fry samples by color and texture standards. Seedlings making acceptable fries were BR6273-1, B6518-5, B6562-14, B6563-2, B6564-27, B6587-11, B6595-12, and B6603-12.

P.I. table 7. Medium Maturity Yield Test.

Seedlings and Varieties	Yield Per Acre Over 2"		Specific Gravity	Tuber Rating	Chip Ratings			French Fry	
	Cwt.	Pct.			40°F.	50°F.	40-70°F.	Color	Tex.
BR6263-2	364	88	72	4	10.0	7.6	9.3	3.7	M
BR6265-8	345	97	72	4	10.0	9.1	8.8	4.5	I
BR6273-1	346	97	84	4-	10.0	6.3	7.4	2.2	M
BR6315-4	390	92	65	4+	10.0	10.0	10.0	4.9	I
B6376-6	391	94	77	4	10.0	7.8	9.4	3.8	I
BR6442-1	289	92	72	3	10.0	8.1	8.9	4.0	I
BR6456-1	373	93	71	3+	10.0	8.0	9.2	4.2	I
B6493-14	305	96	65	3+	10.0	8.8	10.0	4.3	I
B6518-5	286	80	82	3	10.0	6.3	7.5	2.9	M
B6534-2	416	93	67	3-	10.0	9.9	10.0	4.5	I
B6545-7	370	87	69	3	10.0	9.8	10.0	4.3	I
B6545-20	431	92	71	3	10.0	9.1	9.9	3.9	S
B6548-1	300	88	66	4	10.0	10.0	10.0	4.8	I
B6553-31	316	96	72	3	10.0	7.5	9.2	3.4	I
B6558-2	332	90	77	3	10.0	8.2	9.7	3.4	M
B6562-14	356	90	85	3-	10.0	5.6	7.5	2.8	M
B6562-22	386	96	66	3-	10.0	8.2	9.8	3.5	S
B6563-2	250	83	81	3-	10.0	7.6	8.3	2.8	M
B6564-9	298	96	81	3+	10.0	5.0	7.2	1.9	M
B6564-27	287	90	85	3	9.0	4.4	6.0	1.8	M
B6565-2	407	94	66	3+	10.0	9.2	9.9	4.1	I
B6573-25	374	96	60	3-	10.0	8.8	9.9	3.6	I
B6581-17	360	92	76	3-	10.0	7.9	9.6	3.6	S
B6587-11	389	91	80	3-	10.0	7.1	8.9	2.9	I
B6591-7	331	90	76	3	10.0	9.1	9.7	4.2	I
B6595-12	239	82	97	3+	9.0	3.8	4.9	1.8	M
B6603-12	291	80	90	3	9.0	4.4	5.3	2.4	M
BR6609-7	328	94	77	3-	10.0	6.2	8.0	3.3	M
Alamo	367	91	66	3	10.0	8.4	9.9	4.0	I
Chippewa	361	92	68	3	10.0	8.0	9.0	3.5	S
L.S.D.5%	49.9		4			1.0	0.6	0.7	

See footnotes at end of table 6.

Late Maturity Yield Test. Twenty-seven numbered seedlings and four named varieties were planted in the late maturity yield test (P.I. table 8). All entries were hand planted on May 15, 1969 and quick-killed on September 12, 1969. Allowing a growing season of 120 days. Plots were harvested on September 26, 1969. Sixteen seedlings and varieties (BR6312-2, BR6446-2, BR6463-2, B6518-4, B6519-6, B6527-33, B6537-4, B6567-12, B6581-4, B6581-15, B6595-5, B6596-1, BR6614-1, BR6626-5, Kennebec, and Wauseon) produced yields significantly higher than Katahdin. Three entries, BR6312-2, B6519-6, and B6567-12 outyielded Kennebec. One seedling, B6529-1, was lower in yield than Katahdin.

Twenty-four of the seedlings tested produced from 90-98 percent of total yield larger than 2 inches. A size problem was apparent with the three seedlings which produced less than 90 percent primes.

The specific gravities for Katahdin and Kennebec were 1.074 and 1.081 respectively. Sixteen seedlings had specific gravity readings significantly higher than Katahdin. Five of these were higher than Kennebec. Two entries were lower in specific gravity than the check Katahdin. BR6290-9 had the highest specific gravity of the seedlings tested. Lenape was the highest of the check varieties.

All entries had tuber ratings equal to one or more of the 4 control varieties except B6529-21, B6530-4, B6581-15, B6587-8 and B6603-6. BR6290-3 and -9 had outstanding tuber ratings.

The color of chips made from samples taken after four months of storage at 50° F. ranged from 6.2 to 10.0. BR6293-12, B6518-4, and Lenape produced chips considered to be commercially acceptable. After four months of storage at 40° F. followed by a two-week period of reconditioning at 70° F. only one entry, Lenape, produced acceptable chips. None of the entries would chip direct from 40° F. storage.

Entries were screened for french fry color and texture after four months of storage at 50° F. Five seedling entries, BR6293-12, BR6463-2, B6516-19, B6518-4, and B6595-5 produced acceptable fries by color and texture standards.

P.I. table 8. Late Maturity Yield Test.

Seedlings and Varieties	Yield Per Acre Over 2"		Specific Gravity	Tuber Rating	Chip Ratings			French Fry	
	Cwt.	Pct.			40°F.	50°F.	40-70°F.	Color	Tex.
BR6290-3	393	90	84	4-	10.0	8.9	9.5	4.2	I
BR6290-9	338	94	91	4	10.0	7.5	8.3	3.2	I
BR6293-12	352	86	84	3	9.0	6.2	8.2	2.0	I
BR6312-2	522	97	63	3+	10.0	10.0	10.0	5.0	S
B6359-1	326	96	70	3	10.0	8.5	8.7	3.3	S
BR6446-2	438	98	75	3+	10.0	9.9	9.7	4.5	I
BR6463-2	429	93	83	3+	10.0	8.3	8.6	3.0	I
BR6491-7	325	98	89	3	10.0	9.7	8.3	3.7	I
B6516-19	336	94	88	3	10.0	7.2	7.5	2.8	M
B6516-27	355	96	79	3	9.0	7.7	8.2	3.2	I
B6518-4	425	96	81	3-	9.0	7.0	7.9	2.5	I
B6518-8	357	89	89	3	9.0	8.2	8.3	3.1	M
B6519-5	375	93	80	3+	10.0	8.0	8.5	3.1	S
B6519-6	457	96	72	3	10.0	9.6	9.9	4.6	I
B6527-33	403	94	80	3	10.0	8.1	7.4	3.1	S
B6529-21	293	93	71	3-	10.0	9.0	9.1	3.5	I
B6530-4	347	98	74	3-	10.0	9.0	9.0	3.8	S
B6537-4	409	96	74	3+	10.0	9.9	10.0	4.9	S
B6567-12	468	96	78	3+	10.0	9.4	9.3	4.4	I
B6581-4	419	94	70	3	10.0	8.6	9.4	3.4	I
B6581-15	427	93	66	3-	9.0	8.4	9.1	3.3	I
B6587-8	360	87	79	2+	10.0	9.3	9.7	3.6	I
B6595-5	427	93	85	3	10.0	7.6	8.8	2.9	I
B6596-1	404	97	72	3	10.0	8.7	9.9	4.0	I
B6603-6	371	97	88	3-	10.0	8.4	7.9	3.5	I
BR6614-1	398	98	80	3+	10.0	9.0	9.1	3.5	I
BR6626-5	419	94	80	3+	10.0	9.4	9.4	3.8	I
Katahdin	349	94	74	3+	10.0	9.0	9.2	3.3	I
Kennebec	410	97	81	4	10.0	7.1	8.0	2.2	I
Wauseon	396	93	75	3	10.0	9.2	9.8	3.6	S
Lenape	346	93	100	3	9.0	6.1	7.0	1.2	M
LSD 5%	46.4		5.0			1.0	0.9	0.7	

See footnotes at the end of table 6.

POTATO DISEASE INVESTIGATIONS

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Screening for disease resistance is an important part of the USDA Potato Improvement Program. Each year a number of advanced seedlings are introduced into the disease testing program and evaluated for resistance to 12 potato diseases. Procedures for each disease test and results are given below. Results of the ring rot and spindle tuber screening test will be found in the Maine report by Donald Merriam and others.

Fungus Diseases:

Resistance to Common Scab. In 1969 the test for resistance to common scab included 56 new advanced seedlings, Green Mountain was used as a standard check. Each selection consisted of 2 hill subplots replicated 3 times. Guard rows and every third row throughout the plot were planted to Green Mountain. Because of adequate rainfall throughout the 1969 growing season, soil moisture was maintained at near uniform levels. Under these conditions one would expect a lower incidence of scab. The data presented in table 1 appears to bear this out. Note, the susceptible Green Mountain had only a 2/3 scab rating. Data for this test are summarized in P.I. table 1. An average rating for the 3 replications can be found in Column E, while in Column F the most severe scab reaction can be found.

Resistance To Verticillium Wilt. Potato wilt caused by Verticillium sp. is becoming increasingly more important in areas of commercial potato production. Chemical control through soil fumigation is effective in reducing the incidence of potato wilt. The effect is in part an indirect one through the control of nematode populations. However, soil fumigation adds to production costs. Proper management of water in irrigated areas and careful cultural practices, i.e., crop rotation programs, and sanitation practices, provide limited control measures. It is clear that screening new seedlings for natural resistance or tolerance is important to the National Breeding Program.

The cool, moist conditions of the 1969 growing season in Maine provided rather severe testing conditions for the seedlings included in the Verticillium wilt test. The test plot was planted June 5 and consisted of 5 hill subplots replicated 4 times. Houma, Cherokee, and Kennebec were used as standard checks.

To insure pathogenicity two isolates of Verticillium albo-atrum Reinke & Berth. non-microsclerotia type were selected. Inoculum was grown in potato dextrose broth and shake culture. After 5-6 days of growth, bud cells were collected by centrifugation and prior to inoculation resuspended as a slurry in distilled water. Tubers of the selected seedlings were freshly cut and dipped in the slurry and planted immediately into preformed rows. Fertilizer 10-15-15 at 1200# per acre and disyston at 18# per acre were incorporated when the rows were formed. The inoculated seed pieces were covered immediately with soil and a full hill was applied after planting was completed. These data are summarized in P.I. table 1, columns G and H. Evaluations were made on 8-28-69. Nine of the 56 tested indicate potential sources of tolerance. These seedlings will be evaluated next year to determine if the tolerance is stable.

Pink eye or brown eye caused by species of Pseudomonas and associated with Verticillium wilt was also evaluated on tubers of the 56 advanced seedlings. Twelve tubers from each 5 hill subplot or a total of 48 tubers in all were evaluated for pink eye. These data are found in P.I. summary table 1, column 1. From the data, which varied considerably, it is difficult to draw any general conclusion about the relationship between pink eye and Verticillium wilt.

Rhizoctonia solani. This test was planted in what is called the old Virus-Y test plot on Aroostook Farm. This particular plot was selected because of the severe stem canker observed on the variety Green Mountain during previous years. The test consisted of 3 hill subplots with 4 replications. No artificial inoculum was introduced. At harvest tubers were washed and separated into 4 groups, clean tubers bearing no sclerotia, and 3 disease categories, light, medium, and heavy sclerotial development. The data presented in table 1, column J, reflects the percentage of tubers bearing sclerotia and combines all 3 sclerotial categories. Several varieties were included as controls, Mohawk highly tolerant and Norland very susceptible. Seedlings B6516-19, B6529-21, P6562-22, and BR6614-1 indicated degrees of tolerance comparable to Mohawk, which has been shown to be tolerant to sclerotial development.

Resistance to Early Blight Caused by Alternaria solani. In 1969 the advanced seedlings were evaluated for resistance to Alternaria solani (Ell. and G. Martin) Sor. The test consisted of 2 hill plots replicated twice. It was planted on May 22 and inoculated with a spore suspension of the pathogen on 8-6-69. Inoculum was obtained from 2 isolates grown on potato dextrose agar. The plot was evaluated on 8-28-69 for general plant condition, percentage of foliage showing typical target spot lesions and for lesion development. The results indicated a good correlation between plant condition and foliage infected. The data are presented in table 1, columns N, O, and P.

Resistance to Potato Late Blight, Common Race of Phytophthora infestans (Mont.) de Bary

The advanced seedlings were screened for immunity to the common race, (R-0) of Phytophthora infestans, in a field plot on Aroostook Farm (AF). Each selection consisted of 2 hill plots replicated twice. The variety, Green Mountain, was planted in guard rows as well as every third row within the plot. The entire plot was inoculated successfully with a zoospore, sporangial suspension on July 17 and July 23. Sporulating lesions developed and spore dispersal within the plot was evident by 8-4-69. A single evaluation was made on 8-25-69 using the following system: 0 = no blight, and 5 plants dead from blight. These data are summarized in summary table 1 under column M. Thirty-three of the 56 seedlings tested were immune to R-0 of P. infestans indicating the presence of at least one major gene. Seedlings BR6442-1, B6516-19, B6519-5, B6519-6, B6581-17 and BR6614-1 correlated with the field resistance test at Oxbow indicating acceptable levels of polygenic resistance to P. infestans. Sixteen host differentials were included in the test plot and all except the R-4 indicator remained free of late blight indicating that R-0 and R-4 were the only races present when the vines were destroyed.

Field Resistance to Race 1,2,3,4 of Phytophthora infestans, Oxbow, Maine.

The Oxbow multigenic resistance test consisted of 2 hill plots replicated twice with two planting dates to eliminate the effect of maturity. Green Mountain, Kennebec and Sebago were alternated in the infector rows to insure a continued release of inoculum throughout the test period. Planting dates were 6-4-69 and 6-27-69. The first successful inoculation with a zoospore, sporangial suspension was made on 7-17-69. Subsequent inoculations were made on 7-23, 7-24, 7-28 and 8-5-69. The late planting was inoculated twice more on 8-14 and 8-15. Primary lesions developed from each inoculation producing sporangia. In general, cool, moist weather prevailed throughout the test period. For a few days in early August the near optimal climatic conditions favored "late blight development and spread." But, cool night temperatures tended to keep sporulation minimal. The first evaluation of the early planting was made on 8-21-69, the second evaluation on 9-7-69. Blight had not yet developed in the late planting to the extent a valid reading could be made. Therefore, the data in table 1, reflects the readings made on the early planting only. The West Virginia test, however, represents a mean value of both the early and late plantings. Evaluation was based on a scale of 0-5: 0 = no late blight, and 5 indicated plants dead from late blight. These data are summarized in Summary table 1, columns K and L. Seedlings BR6442-1, B6518-4, B6529-21 and B6581-15 demonstrated a level of field resistance comparable to Sebago, while Green Mountain and Katahdin were read at 5- and 4 respectively.

Virus Diseases of Potato:

Immunity to Potato Virus X (P.V.X.)

Resistance to Potato Virus-X was conducted in the greenhouse at Presque Isle, Maine. Seedlings were planted in a soil bench and inoculated with a virulent strain of P.V.X. Following sufficient time for growth the plants were indexed visually, by local lesion indicator, (*Gomphrena globosa*) and/or by serology. In 1969 only 2 of the 56 seedlings tested were found to be immune to P.V.X.: BR6491-7 and B6581-17. The remaining 54 seedlings were susceptible to P.V.X. as indicated by 1 or all 3 indexing techniques, see Summary table 1, column B.

Immunity to Potato Virus Y. In 1969 the test for resistance to Potato Virus Y (P.V.Y.) was conducted under 2 lumite screen cages measuring 24' x 12' x 6'. The seedlings were tested in 2 hills replicated twice. A rugose mosaic Green Mountain plant was spaced between 2 healthy seedlings. Once the plants had emerged and were established (10-12" in height), aviruliferous aphids were placed on the Green Mountain source plants and free migration was permitted. Seedlings were evaluated on 3 different dates to eliminate the possibility of escapes. Only 1 of the advanced seedlings indicated immunity to P.V.Y. when evaluated visually, by serological techniques and by the A-6 leaf test. The remaining 55 seedlings indicated susceptibility to P.V.Y. by typical vein necrosis or by serological and A-6 leaf test, see Summary table 1, column C. The A-6 leaf test and serology was conducted by Mrs. Danuta Olszewska, visiting Scientist of the Shr Ciekocino, Poland.

Resistance to Leafroll Virus. The test for leafroll resistance and net necrosis like the P.V.Y. and P.V.A. test were conducted under lumite screen cages measuring 24' x 12' x 6'. Both the leafroll and net necrosis tests consisted of 2 hill subplots replicated 4 times. The test seedlings separated by a leafroll

infected Katahdin source plant were planted on 9" centers. Once plants were well established (10-12" in height), aviruliferous green peach aphids were transferred to the Katahdin source plants, 10-12 aphids per plant. Aphid populations were allowed to increase, forcing migration from the infector plants to the healthy seedlings. Care was taken to prevent aphid population expansion to the detriment of the seedlings. When sufficient numbers of aphids were detected on the test seedlings, the aphids were destroyed by the application of a foliar insecticide. Seedlings were evaluated several times to eliminate the possibility of escapes. The final evaluation indicated that all seedlings tested in 1969 were susceptible.

Resistance to Net Necrosis. This test was identical to the leafroll test except that the infector plants were not infested with aviruliferous aphids until the seedlings had set tubers up to 1.0"-1.25" in diameter. Test results are unavailable at this time.

Resistance to Potato Virus A. This test was also conducted under lumite screen cages 24' x 12' x 6'. The test consisted of 2 replications comprising 2 hills each, separated by a mild mosaic Green Mountain plant. The plants were infested with aviruliferous green peach aphids. Aphids were allowed to increase on the source plants and spread to the healthy seedlings. After sufficient acquisition and feeding periods, aphids were destroyed by a foliar insecticide. Evaluation of Virus A in the field is difficult under optimum conditions. Therefore, tubers from each of the 2 hills were harvested and taken to Beltsville for Virus A indexing. Suspect and borderline cases are graphed to Virus A indicator seedling A-6 and/or X41956 which gives a top necrosis hypersensitive reaction to P.V.A. Data from these tests are not available at this time

Multiple Disease Resistance. It is highly desirable to incorporate into high yielding commercially acceptable varieties as many disease resistant characters as possible. Table 1 lists the 56 advanced seedlings and their performance when exposed to 9 common diseases of potato. It is interesting to note that seedling BR6442-1 has tolerance to Verticillium wilt, pink eye, Race-0 of Phytophthora infestans, moderate field resistance to Race 1,2,3,4 of P. infestans, and tolerance to Alternaria solani and produces acceptable yields.

P.I. table 1. Evaluation of 56 advanced seedlings for response to 9 common potato pathogens.

Variety	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	1969 Key No.	Virus X	Virus Y	Leafroll Virus	Potato Scab Ave.	Potato Scab Most severe reading	Verticillium wilt	Pct. S.E.D.	Pct. Pink Eye tubers	Pct. Tubers with Sclerotia	Maine Polygenic L.B.Res, R-1,2, 3,4	W.Va. Polygenic L.B.Res, R-1,2, 3,4	Maj. Gene Res. R-0	E.B. Pct.Foliage infection	E.B. Lesion Size	E.B. Plant condition	Relative Yield
BR6442-1	1	+	+	8/8	1/2	2/3	2.2	35	0	74	3+	3+	1+	35	3	3.0	2+
BR6446-2	2	+	+	8/8	T/3	T/3	8.2	48	2.6	47.5	4+	4+	4	50	5	4.0	2+
BR6448-7	3	+	+	8/8	1/3	2/3	9.1	74	0	78.2	4+	5	0	40	3	6.0	3-
BR6456-1	4	+	+	8/8	2/3	2/3	8.7	100	38	41.0	4+	5	5	75	5	7.5	2+
BR6463-2	5	+	+	8/8	1/2	2/3	9.5	92	2.0	33.4	4	4	0	35	5	5.5	2+
BR6491-7	6	+	-	4/4	1/2	2/3	6.5	57	7.0	34.3	3	4	0	45	4	4.0	3-
B6493-14	7	+	+	8/8	1/2	1/2	3.8	38	0	22.3	4+	5	5	100	5	7.5	2+
B6516-19	8	+	+	8/8	3/3	3/3	4.9	75	0	1.8	3+	5	2	25	3	3.5	3
B6516-27	9	+	+	8/8	1/3	1/3	2.4	37	0	54.8	4+	5	4	25	3	4.0	2
B6518-2	10	+	+	8/8	1/2	2/4	7.9	78	0	40.4	4+	4+	0	40	2	4.5	2
B6518-4	11	+	+	8/8	1/3	2/3	9.3	93	0	36.6	3	3+	0	60	3	6.0	3-
B6518-5	12	N.T.	+	8/8	2/3	3/3	6.5	32	0	32.7	3+	5	0	55	4	4.0	2-
B6518-8	13	+	+	8/8	3/3	1/3	8.1	91	13	34.5	4+	3+	0	60	3	5.5	3+
B6519-3	14	+	+	8/8	T/2	T/1	7.8	81	2	55.1	4+	5	0	80	4	5.0	2
B6519-5	15	+	+	8/8	1/2	1/3	8.9	90	0	29.5	3	4+	3+	30	3	4.5	2
B6519-6	16	+	+	8/8	T/1	T/2	7.9	92	8.0	44.8	4+	5	4+	25	3	4.0	2+
B6527-33	17	+	+	8/8	1/2	2/3	8.4	71	0	74.8	4+	5	4+	35	3	4.5	2+
B6529-12	18	+	+	8/8	1/2	2/2	8.9	83	0	71.2	4+	4+	0	60	4	4.5	2
B6529-21	19	+	+	7/7	1/2	2/2	2.5	46	0	17.3	3+	3	0	35	4	3.5	3
B6530-4	20	+	+	8/8	1/1	2/1	8.9	93	9	40.8	4-	1	0	25	4	4.0	2+
B6534-2	21	+	+	8/8	2/2	3/3	8.5	98	9	29.7	5-	4+	0	60	4	6.5	2
B6535-10	22	+	+	4/6	2/3	3/3	3.2	2	2	53.6	5	5	5-	70	3	6.5	3-
B6537-4	23	N.T.	+	8/8	T/1	1/1	7.1	87	2	75.6	4+	5	0	95	5	8.0	3-
B6545-7	24	+	+	8/8	T/2	1/2	7.4	74	0	47.9	4+	5	0	70	5	4.5	3
B6545-20	25	+	+	8/8	2/3	2/3	8.8	84	2	38.2	4+	5	0	35	3	4.5	2+
B6547-7	26	+	+	8/8	2/3	2/3	8.2	69	0	45.3	4+	5	0	60	5	7.0	3-
B6548-1	27	+	+	N.T.	N.T.	N.T.	7.7	66	0	49.4	4+	4+	0	60	5	-	3-

continued

P.I. table 1 continued.

B6553-31	28	+	+	8/8	T/2	1/3	6.6	59	0	88.7	4+	3+	0	35	4	4.5	3
B6558-2	29	+	+	8/8	2/2	3/3	8.0	94	0	82.8	4+	4	0	55	4	4.5	2
B6558-16	30	+	+	8/8	1/2	2/3	7.5	83	6	53.8	4+	4+	0	75	4	5.0	3-
B6562-14	31	+	+	8/8	T/2	1/2	8.3	84	2	70.4	4+	5	0	35	4	4.5	2
B6562-22	32	N.T.	+	8/8	1/2	3/3	7.2	88	27	19.0	4+	3+	0	25	4	4.0	2+
B6563-2	33	+	+	8/8	T/2	1/2	8.7	80	0	52.7	5	4+	0	90	5	7.5	3-
B6564-9	34	+	+	8/8	T/1	1/2	4.6	77	0	34.0	4+	5	4	70	4	5.5	3-
B6564-27	35	+	+	8/8	1/2	2/3	8.3	79	5	40.0	4+	5	5	95	5	7.5	2+
B6565-2	36	+	+	8/8	1/2	1/2	8.5	88	15	28.0	4	5	5	30	3	4.5	2+
B6567-12	37	+	+	8/8	1/2	2/2	2.9	39	5	75.3	4	5	0	10	2	5.0	3
B6573-11	38	+	+	8/8	2/3	3/3	9.5	96	2	32.0	4	5	0	70	5	6.0	2
B6573-25	39	+	+	8/8	1/2	2/2	8.4	82	8	61.0	4+	3	0	45	3	5.0	3-
B6581-4	40	+	+	8/8	1/2	2/2	8.4	82	2	32.7	4	5	0	65	4	6.5	2-
B6581-15	41	+	+	8/8	T/2	T/3	8.8	83	2	49.1	3	2	0	35	4	4.5	2
B6581-17	42	+	+	8/8	T/2	1/2	9.2	77	8	44.3	3+	5	0	65	4	5.0	2+
B6587-8	43	-	N.T.	6/8	1/3	1/3	8.2	47	0	21.7	4	5	1+	25	4	4.5	3-
B6587-11	44	+	+	8/8	2/3	3/4	6.1	94	2	53.2	4	5	5	30	4	4.0	3-
B6591-7	45	+	+	8/8	1/3	2/3	1.2	0	0	43.0	4+	5	4	40	4	5.5	3+
B6595-5	46	+	+	8/8	T/2	T/2	3.6	2	0	54.0	4	5	4	50	4	4.0	3+
B6595-12	47	+	+	8/8	T/1	1/3	9.3	72	0	75.3	4+	5	0	85	4	6.5	2
B6596-1	48	+	+	8/8	1/2	2/3	6.5	85	17	53.7	2+	4+	0	45	4	4.5	2+
B6597-20	49	+	+	8/8	T/1	T/2	8.1	87	6	57.4	4+	5	0	55	5	5.0	3-
B6599-1	50	+	+	8/8	1/2	2/3	6.3	75	0	64.6	4	5	4-	50	4	5.0	2+
B6603-6	51	+	+	8/8	2/3	2/3	1.0	42	0	52.5	3+	5	0	30	4	4.0	3
B6603-12	52	+	+	8/8	2/2	2/3	8.5	90	10	68.4	4	5	4	55	4	4.5	2+
BR6609-7	53	+	+	N.T.	N.T.	N.T.	5.0	2.7	0	43.8	4+	5	5-	-	-	-	3-
BR6614-1	54	+	+	8/8	3/4	3/4	7.7	89	4	9.8	3+	5	3	40	4	4.0	2+
BR6617-2	55	+	+	8/8	T/2	T/2	7.4	76	4	22.4	5	5	0	85	4	6.5	2+
BR6626-5	56	+	+	8/8	2/2	2/3	8.4	83	2	24.1	4	5	0	65	4	4.5	2
Green Mountain					2/3	2/3				60.7	4+	-	4+				
Kennebec							8.0	89	40	35.0	3+	4+	0				2+
Cherokee							9.2	96	2	-							2
Houma							4.4	52	3	-							3
Wauseon										47.0							
Mohawk										11.0							
Norgold										30.0							
Katahdin										47.0							
Norland										80.4							

continued

P.I. table 1 continued.

EXPLANATION OF TABLE

1. A, 1969 Key No.
2. B, Potato Virus-X
3. C, Potato Virus-Y
4. D, Potato Leafroll Virus
5. E, Potato Scab, mean value of 3 replications
6. F, Potato Scab, most severe rating
7. G, Verticillium wilt, Plants were evaluated on the basis of leaf area destroyed by chlorosis and defoliation: 1 = healthy plants, 10 = plants dead
8. H, Verticillium wilt, percent of tubers showing stem end discoloration, S.E.D.
9. I, Pink Eye, Percentage of tubers showing pink eye lesions, based on a total of 48 tubers, 4 replications, 12 tubers per replication
10. J, Percentage of tubers bearing sclerotia of Rhizoctonia solani
11. K and L, late blight, polygenic resistant reaction to Race-1,2,3,4 of Phytophthora infestans: 0 = no blight, 5 plants dead from blight
12. M, late blight, major gene influence on Race-0 of Phytophthora infestans
13. N, early blight, percentage of foliage showing typical lesions of Alternaria solani
14. O, early blight, lesion size: 1 = no lesions; 2 = pinpoint lesions; 3 = lesions up to 1/4"; 4 = lesions up to 3/8"; 5 = lesions up to 1/2"; 6 = lesions larger than 1/2"
15. P, early blight, condition of plant: 1 = healthy plant; 10 plants dead
16. Q, relative yield: 1 = poor; 5 = best

IR-1 INTER-REGIONAL POTATO INTRODUCTION PROJECT

R. W. Ross and P. R. Rowe

a. Introduction of New Stocks

One hundred seventy-three new stocks were received from 13 countries. Ninety-two were Mexican species collections. Another 47 were clonal stocks known to possess characters of potential economic value, obtained in response to specific requests.

b. Preservation and Increase of Stocks

Approximately 90% of the species introductions are being maintained as true seed. Seed germination tests were carried out for 835 seed lots 2-16 years old. Recently harvested seed samples of 134 introductions were sent to the National Seed Storage Laboratory, Fort Collins, Colorado. Over 220 clonal selections were indexed for viruses A, X and Y. Satisfactory increases of 201 seed introductions were obtained under glass, plastic or screen.

c. Classification

Four hundred six herbarium specimens were prepared from seedling populations of 114 species introductions, to exemplify intraspecific variability. Duplicate specimens were prepared as requested by Solanum taxonomists J. G. Hawkes, Birmingham, England, or C. Ochoa, Lima, Peru, for further study and inclusion in their herbaria. Prof. Hawkes spent two weeks here, classifying introductions added since his visit in 1965. Prof. Ochoa spent four weeks here, annotating the introductions of Peruvian origin and classifying 107 donations (including three previously undescribed species) from his most recent collections.

d. Distribution of Stocks

Shipments were sent to 21 states and 24 countries. Shipments included 2910 seed and 1779 tuber samples of species introductions and 57 seed and 387 tuber samples of germ-plasm involving introductions developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project. Three samples of frozen foliage (15-20 lbs. each) were sent to two labs for biochemical studies.

More than 300 copies of the newly revised "Inventory of Tuber-Bearing Solanum Species" were distributed to potato researchers and libraries around the world. The inventory tabulates over 1500 introductions of wild and cultivated species currently available and the data derived from published and unpublished reports of researches utilizing them through September, 1968.

Mimeographed listings of 175-250 species introductions available in the form of tuber families (mainly for the benefit of potato workers without adequate greenhouse facilities) were distributed each year, 1967-1969. The demand for this material has been so great that this procedure has become a regular part of the program.

e. Evaluation of Stocks

The somatic chromosome numbers of 438 species introductions were obtained. Seedling families of 245 interspecific crosses, frost-resistant species x frost-susceptible S. tuberosum, and first and second backcrosses to S. tuberosum, were evaluated in the field at Sturgeon Bay for tolerance to freezing temperatures.

f. Usefulness of Findings

The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germ-plasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Five new potato varieties with introductions in their pedigrees (Cascade, Norchief, Norchip, Pride and Seminole) were released for commercial production in 1968-1969. One hundred fourteen of the 120 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties comprise approximately 65% of the annual seed potato production in the United States.

Basic research programs being conducted in several states and other countries are providing information concerning the potential value and diversity of the Solanum species. In 1968, 28 papers, 12 abstracts and 2 theses reporting the use of Solanum introductions appeared. These researches will provide the knowledge needed for more effective use of the Solanum species.

NORTH CENTRAL REGIONAL TRIAL - 1969

R. H. Johansen and Cooperators¹

1969 was the nineteenth year that North Central Regional Potato Trials have been conducted. The trials are grown in twelve states.

Each year approximately fourteen to sixteen advanced breeding lines and three check varieties are grown in trial at each location. With the number of states involved, the breeder, researcher and grower has the opportunity to evaluate breeding lines over a wide range of environmental conditions.

Today five of the top ten potato varieties grown for certification in the U. S. have been tested during its development in the North Central Regional Trial. This alone speaks well for the purpose of the North Central Regional trials.

Recent variety introductions that have been tested in the North Central Regional trial:

<u>Progeny No.</u>	<u>Yr. Released</u>	<u>Released By</u>	<u>Released Name</u>	<u>Parents</u>
Neb 16.55-1	1969	Nebraska	Surchip	226.49-1 x 25.47-7X
Neb 48.57-3	1969	Nebraska	Sioux	83.55-3 x 156.52-2

Environmental Conditions: Soil type at each location ranged from clay loam to coarse sand, with the majority of trials being grown on sandy or sandy loam soils. The Louisiana trial was grown on alluvial Mississippi River bottom soil.

Cultural Practices: (fertilizer applications, irrigation, spray, program, vine killing, planting distance) are based on local conditions.

Systemic insecticides such as thimet and Di Syston along with a foliage spray program were used on trials in several states. D.D.T. Sevin Malathion and thiodan were the most common foliage insecticides used. For blight control Dithane M45, Maneb fixed copper and polyram were used. Dacthal, Diphenamid 4, Iorox and Eptam were the most popular herbicides.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Indiana	3/31	8/4	127
Iowa	4/12	7/30	110
Kansas	3/31	7/18	110
Louisiana	1/16	5/27	132
Michigan	5/13	10/9	150
Minnesota	5/7	8/28	113
Missouri	4/3	8/4	124
Nebraska	5/17	9/23	130
North Dakota	5/6	9/15	133
Ohio	5/28	10/10	135
South Dakota	5/28	9/20	115
Wisconsin	5/2	9/22	144

¹ Indiana, C. M. Jones; Iowa, J. Weigle & L. Peterson; Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist, F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. Johansen; Ohio, J. Gauss; South Dakota, C. M. Nagel; Wisconsin, J. Schoennman, D. Kichefski, S. Peloquin; USDA, R. Webb.

Rainfall and temperature again varied during 1969. However, most states had abundant or in some cases excessive rainfall early in the season. Temperatures were generally on the cool side in the northern states. Some states experienced cool conditions following planting that led to some seed piece decay. In Nebraska a freeze occurred while the plants were emerging. It was dry in North Dakota, Michigan and several northern states during August and September. Louisiana had unfavorable weather conditions for good potato production.

Entries: Entries for 1969 were received from Nebraska, Wisconsin, Louisiana, U.S.D.A. Maine, North Dakota, Minnesota and Michigan. North Dakota supplied the check varieties Norland, Red Pontiac and Irish Cobbler. The usual or annual problem occurred where selections for trial either froze in transit or the seed was not shipped to all cooperators. It is hoped that one of these years all entries will be uniformly tested at all locations.

Yield: Total and U.S. No. 1 yields are reported in Tables 1 and 2. Again, it was necessary to report both U.S. No. 1 and total yield as Indiana only reported total yield. The highest yields occurred in Wisconsin, Minnesota and Michigan. Wisconsin had an overall average yield of 321 cwt per acre. Louisiana reported extremely poor yields. Kansas and South Dakota also had low U.S. No. 1 yields.

Yield: U.S. No. 1 (early group) If M.S. 709 can be considered early this selection was the highest yielding entry in the early group. However, M.S. 709 was not tested in Louisiana and South Dakota where low yields occurred. Little differences in yields occurred for the other entries in this group. M.S. 709 produced yields higher than Red Pontiac in the North Central Regional trials.

Yield: U.S. No. 1 (late group) Again Red Pontiac was the highest yielding entry in the late maturing group but for both the early and late group M.S. 709 produced the highest average yield. B 5415-6 and Nebraska 16.55-1 ranked the next highest in yield. Nebraska 16.55-1 has produced high yield the past three years. Minnesota 40 was the lowest yielding entry in both the late and early groups.

Maturity: In the early group M.S. 709 was classified as being late at most locations except Michigan. The maturity ranking for this selection was similar to Red Pontiac. Norland was the earliest maturing entry while Nebraska 48.57-3 was the latest. Iowa 6413 and Minnesota 172 were generally ranked as being quite early.

Total Solids: Minnesota 140, B 5400-8, Wisconsin 664 and ND 5761-5 all averaged above 19.0 per cent total solids. All of these selections and ND 6993-13 Russ were higher in total solids than the check variety Irish Cobbler. ND 6948-14R produced the lowest total solids. When comparing locations Nebraska and North Dakota averaged the highest in total solids.

Scab Reaction: Iowa, Louisiana, Missouri and South Dakota reported no scab. Several selections were found to have scab resistance equal to or better than Norland; however, several selections seemed to have a high amount of scab. Minnesota 140 and B 5400-8 were found to be quite susceptible to scab.

Internal and External Defects: For the benefit of the person responsible for the entry, selections with possible weakness are starred. This does not mean that this particular selection should be discarded, as in the 1969 trial, several selections have a high amount of internal or external defects. However, the check varieties, Irish Cobbler and Norland also have a high amount and these varieties have been grown for a long time. Some defects naturally are more detrimental than others and also occur under different environmental conditions.

Overall Merit Ratings: Merit ratings are presented for the 1967, 1968 and 1969 seasons for possible comparisons.

	<u>1967</u>	<u>1968</u>	<u>1969</u>
I 6413	*	34	34
Neb 16.55-1	20	15	19
B 5400-8	*	*	19
ND 6993-13 Russ	*	*	15
Norland	24	16	13

* Not entered

I 6413 with 34 merit points also ranked the highest in 1968. The 1968 summary erroneously reported this selection as being second with 23 merit points. The coordinator of the North Central Regional trials apologizes for this error.

North Central Table 1. Total Yield. (cwt. per Acre)

Variety	Ind.	Iowa.	Kans.	La.	Mich.	Minn.	Mo.	Nebr.	N. Dak.	Ohio	S. Dak.	Wisc.	Ave.
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
<u>Early to Med. Early</u>													
ND 6948-14R	421	379	103	33	420	427	291	193	214	172	113	624	283
La 12-157	309	307	180	46	217	297	177	276	209	187	68		207
M.S. 709	330	320	130		472	492	275	236		183		662	344 1/
Norland	401	365	149	41	309	420	231	164	256	181	173	405	258
Cobbler	435	353	152	22	384	365	259	342	224	188	184	432	
<u>Med. to Late</u>													
I 6413	451	391	75	41	403	353	208	334	245	198	82	432	278
B 5400-8	402	352	125		284	397	268	213	207	182		536	297
B 5415-6	549	374	80		438	437	237	271	255	285	197	530	332
Wisc 664	343	304	126		384	277	218	306	255	183	84	582	278
Minn 140	276	264	87		194	372	125	151	190	161	42	450	210
Minn 172	239	312			275	288		135	210	138	79	368	227 1/
Neb 16.55-1	579	377	81	70	376	432	266	305	292	204	190	525	308
Neb 48.57-3	466	258	168	72	474	431	210	212	218	227	148	620	292
Neb 91.57-18	432	353	123	55	372	338	193	238	253	183	71	460	256
ND 5761-5	394	322	104	60	323	387	274	294	183	174	114	497	261
ND 6593-13 Russ	314	355	112	29	271	270	221	266	185	243	105	465	236
Red Pontiac	549	389	144	55	465	446	367	277	315	257	201	750	351
B 5960-13							245	277	179				
Average	405	340	121	48	357	378	239	248	229	197	123	521	

1/ Average nine locations.

North Central Table 2. U.S. No. 1 yield. (cwt. per Acre)

Variety	Ind. ¹ cwt.	Iowa cwt.	Kans. cwt.	La. cwt.	Mich. cwt.	Minn. cwt.	Mo. cwt.	Nebr. cwt.	N. Dak. cwt.	Ohio cwt.	S. Dak. cwt.	Wisc. cwt.	Ave. cwt.
<u>Early to Med. Early</u>													
ND 6948-14R		249	47	20	378	354	261	140	194	156	96	570	224
La 12-157		233	85	25	177	235	166	198	191	171	53		153
M.S. 709		283	83		461	463	265	106		162		648	309 <u>2/</u>
Norland		329	82	31	286	375	224	123	234	166	156	363	215
Cobbler		287	36	15	326	287	229	205	197	169	166	377	209
<u>Med. to Late</u>													
I 6413	353		36	28	392	332	201	195	229	184	74	410	221
B 5400-8	253		49		238	330	252	171	175	165		506	238
B 5415-6	316		28		426	402	217	138	244	274	189	510	274
W 664	226		82		349	248	201	183	234	161	73	550	231
Minn 140	155		22		146	277	119	69	165	113	33	374	147
Minn 172	244				253	252		82	195	118	72	323	192 <u>2/</u>
Neb 16.55-1	332		43	57	409	387	244	205	271	195	176	510	257
Neb 48.57-3	163		87	46	434	385	196	112	181	205	132	596	231
Neb 91.57-18	297		78	44	394	312	188	132	231	169	61	428	212
ND 5761-5	229		64	41	271	319	251	142	162	164	101	465	201
ND 6993-13 Russ	237		56	21	217	224	202	192	149	219	90	398	182
Red Pontiac	319		97	39	428	406	344	139	300	237	180	730	293
B 5960-13								143	169				

Average

265 61 33 329 329 223 149 207 178 110 485

1/ No U.S. No. 1 yield reported.

2/ Average only 8 locations

North Central Table 3. Maturity Classification.¹

Variety	Ind. ²	Iowa	Kans.	La.	Mich.	Minn.	Mo.	Nebr.	N. Dak.	Ohio ²	S. Dak. ²	Wisc.	Ave.
<u>Early to Med. Early</u>													
ND 6948-14R	2.7	3.0	2.5	2.0	3.0	2.5	3.0	3.0	3.0	2.0	2.0	2.6	
La 12-157	3.0	4.0	2.5	3.0	3.0	3.0	3.0	3.0	2.0			2.9	
N.S. 709	5.0	4.0		2.5	5.0	4.0	4.0	4.0		4.0		4.1	
Norland	1.0	2.0	1.0	2.0	1.0	1.5	2.0	2.0	1.8	2.0		1.6	
Cobbler	3.0	4.0	2.0	2.0	2.0	2.5	3.0	3.0	2.0	2.0		2.5	
<u>Med. to Late</u>													
I 6413	3.5	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	2.0		2.7	
B 5400-8	4.3	4.0		2.5	3.0	4.0	4.0	4.0	2.0	3.0		3.4	
B 5415-6	4.5	4.0		4.0	4.0	4.0	4.0	4.0	3.0	2.0		3.7	
Wisc 664	5.0	3.0		3.3	5.0	3.0	3.0	3.0	3.8	3.0		3.6	
Minn 140	4.7	4.0		2.5	5.0	4.0	4.0	4.0	4.8	4.0		4.1	
Minn 172	1.5			3.0	2.0		3.0	3.0	2.0	1.0		2.1	
Neb 16.55-1	3.7	4.0	4.0	3.0	4.0	3.5	4.0	4.0	2.5	3.0		3.5	
Neb 48.57-3	4.7	5.0	4.0	3.5	5.0	4.5	5.0	5.0	4.0	5.0		4.5	
Neb 91.57-18	2.5	4.0	3.0	3.3	3.0	4.0	3.0	3.0	2.3	2.0		3.0	
ND 5761-5	4.0	4.0	2.5	3.0	4.0	3.5	3.0	3.0	2.8	4.0		3.4	
ND 6993-13 Russ	3.0	4.0	3.0	3.3	3.0	4.0	4.0	4.0	2.0	3.0		3.3	
Red Pontiac	4.0	3.0	4.0	4.5	5.0	4.0	4.0	5.0	3.0	5.0		4.2	
B 5960-13								4.0	4.0				

¹

- 1 - Very early; Warba Maturity
- 2 - Early; Norland or Irish Cobbler Maturity
- 3 - Medium; Chippewa or Cherokee Maturity
- 4 - Late; Katahdin or Red Pontiac Maturity
- 5 - Very late; Kennebec Maturity

²

No maturity reported.

North Central Table 4. Total Solids.

Variety	Ind.	Iowa	Kans.	La.	Mich.	Minn.	Mo.	Nebr.	N. Dak.	Ohio	S. Dak. ¹	Wisc.	Ave.
	%	%	%	%	%	%	%	%	%	%	%	%	%
<u>Early to Med. Early</u>													
ND 6948-14 R	15.0	14.2	17.0	14.8	15.6	16.7	15.2	18.0	17.7	14.3		16.9	15.9
La 12-157	15.3	15.2	19.0	16.9	15.8	17.5	15.6	20.1	20.3	17.5			17.3
M.S. 709	15.4	15.2	19.0		19.4	17.1	15.6	21.8		16.2		19.0	17.6 ²
Norland	15.2	14.0	17.0	16.7	16.0	16.3	15.6	18.4	20.1	14.8		15.8	16.4
Cobler	16.5	15.7	21.0	16.9	17.3	17.7	17.3	20.7	22.7	16.2		20.3	18.4
<u>Med. to Late</u>													
I 6413	15.2	15.0	18.0	16.5	17.7	17.5	16.1	20.5	19.4	16.0		17.3	17.2
B 5400-8	18.3	16.7	20.0		19.9	20.4	18.0	22.2	22.0	16.7		20.3	19.5
B 5415-6	16.0	15.4	18.0		18.0	18.6	16.7	20.7	21.2	16.7		19.7	18.1
Wisc 664	18.4	17.3	20.0		20.5	20.7	17.3	22.2	20.9	17.5		20.3	19.5
Minn 140	19.4	17.8	23.0		20.7	21.6	18.0	23.1	23.1	18.4		20.9	20.6
Minn 172	16.0	13.7			15.6	15.3		18.6	18.8	15.6		16.7	16.3
Neb 16.55-1	15.8	15.0	19.0	15.4	18.2	17.7	16.5	22.9	21.2	15.6		20.9	18.0
Neb 48.57-3	16.5	16.7	20.0	16.2	20.1	18.6	17.3	19.2	20.1	16.7		19.4	18.3
Neb 91.57-18	16.2	15.2	19.0	17.1	17.5	19.2	18.3	20.1	20.7	16.0		18.2	18.0
ND 5761-5	16.5	16.7	19.0	18.2	19.2	20.3	18.3	22.4	21.3	17.3		20.3	19.1
ND 6003-13 Russ	16.0	15.4	20.0	18.8	18.8	18.4	17.5	21.6	21.8	16.5		20.3	18.6
Red Pontiac	15.0	13.3	17.0	16.2	16.7	17.1	14.8	20.3	18.4	14.1		17.5	16.4
B 5960-13								23.7	22.2				
Average	16.3	15.4	19.1	16.7	18.0	18.3	16.8	20.9	20.7	16.2		19.0	

¹ No total solids reported.² Average over 9 locations.

North Central Table 5. Scab Reactions Reported.¹ (Area - Type)

Variety	Ind.	Iowa	Kans.	La.	Mich.	Minn.	Mo.	Neb.	N. Dak.	Ohio	S. Dak.	Wisc.
<u>Early to Med. Early</u>												
ND 6948-14R	0-1	None	2-1	None	2-1	0-0	None	1-3	2-1	1-1		-5
La 12-157	1-1	"	1-1	"	0-0	2-1	"	1-2	2-2	3-2		
M.S. 709	1-1	"	3-2	"	0-0	2-5	"	1-3		1-1		-5
Morland	1-1	"	1-1	"	0-0	0-0	"	1-2	1-1	1-1		-0
Cobbler	1-1	"	2-1	"	1-4	0-0	"	1-2	2-1	1-1		-5
<u>Med. to Late</u>												
I 6413	0-0	"	1-1	"	0-0	2-1	"	1-3	T-1	1-2		-0
B 5400-8	2-2	"	3-1	"	2-3	0-0	"	1-3	3-2	1-1		-5
B 5415-6	1-1	"	1-1	"	0-0	0-0	"	1-1	2-2	1-1		-3
Wisc 664	2-1	"	1-1	"	0-0	1-2	"	1-3	1-1	2-2		-3
Minn 140	3-4	"	2-3	"	0-0	4-3	"	1-2	2-2	2-4		-0
Minn 172	0-1	"	"	"	0-0	0-0	"	1-2	1-1	1-1		-0
Neb 16.55-1	1-1	"	1-1	"	"	0-0	"	1-1	T-1	1-4		-2
Neb 48.57-3	1-2	"	2-2	"	3-1	2-2	"	1-3	3-1	3-2		-2
Neb 91.57-18	1-1	"	2-1	"	1-4	1-1	"	"	1-1	1-2		-0
ND 5761-5	0-0	"	1-1	"	1-3	0-0	"	1-2	1-1	1-1		-5
ND 6903-13 Russ	0-0	"	1-1	"	0-0	0-0	"	1-1	T-1	1-2		-0
Red Pontiac	1-1	"	2-1	"	1-4	1-5	"	1-2	3-2	1-1		-5
B 5960-13								1-3	4-2			

¹ Area
T = less than 1%
1 = 1-20%
2 = 21-40%
3 = 41-60%
4 = 61-80%
5 = 81-100%

Type
1 = small, superficial
2 = larger, superficial
3 = large, rough pustules
4 = large pustules, shallow holes
5 = large pustules, deep holes

² No scab reported.

North Central Table 6. Summary of Grade Defects.¹

Variety	External				Internal			
	Scab	Growth Cracks	Second Growth	Sun Green	Total Free of Ext. Def.	Hollow Heart	Internal Necrosis	Vascular Discoloration
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Early to Med. Early								
ND 6848-14R	16.6*	3.6*	1.3	1.4	82.3	0.0	13.0*	7.4
La 12-157	28.9*	5.1*	3.5	3.5*	70.4	0.5	2.2	7.6
M.S. 709	16.1	1.8	2.8	12.4	75.8	0.4	0.1	7.3
Norland	14.7	2.6	3.8	2.3*	81.5	0.2*	0.9	13.8*
Cobbler	21.3	1.8	7.1*	7.8	72.0	2.3*	4.5	19.8*
Med. to Late								
I 6413	12.2	1.5	1.4	6.7*	83.5	0.2	1.2	8.6
B 5400-8	28.6*	0.1	1.2	5.2	69.8	0.1	3.2	7.6
B 5415-6	16.1	3.8	7.7*	6.1*	74.6	1.9	1.4	11.3*
Wisc 664	19.6*	4.2	3.5	8.2*	75.1	0.7*	1.5	5.6*
Minn 140	25.2*	6.0*	3.0	3.5	69.6	4.3*	3.2	10.3*
Minn 172	15.7	0.8	1.8	8.8*	77.2	4.7*	17.0*	11.0*
Neb 16.55-1	13.7	1.8	4.6*	6.7*	80.3	1.8	2.6*	9.4*
Neb 48.57-3	30.7*	3.7	8.6*	3.8*	64.2	0.8	11.0*	12.8*
Neb 51.57-18	20.1	0.8	5.1	9.2*	73.7	0.8	3.5	9.4*
ND 5761-5	14.2	4.4*	5.0*	12.3	72.0	0.3	1.5	10.9*
ND 6993-13 Russ	12.5	18.7*	17.0*	2.3	64.3	1.5	1.5	10.5*
Red Pontiac	20.4	3.9	8.3*	3.2	71.2	1.3	1.3	10.7*
B 5960-13	(Not enough data)							

¹ Per cent normal tubers showing no defects (some individual tubers had more than one type of defect).

* Possible weakness of variety.

North Central Table 7. Merit Ratings.¹

Variety	Ind.	Iowa	Kans. ²	La.	Mich.	Minn.	Mo.	Neb.	N. Dak.	Ohio	S. Dak.	Wisc.	Total Points
<u>Early to Med. Early</u>													
ND 6948-14R					4		1		4				9
La 12-157								2		4			6
M.S. 709					5							4	9
Norland		4					4			3	2		13
Cobbler													0
<u>Med. to Late</u>													
I 6413	2	5			1	5	5	5	5	1	5		34
B 5400-8	5					4		1					10
B 5415-6	3	2			2				1	5	4	2	19
Wisc 664										2		5	7
Minn 140													0
Minn 172							3						3
Neb 16.55-1	4	3		5			2	3	2				19
Neb 48.57-3				3									3
Neb 91.57-18	1			4								1	6
ND 5761-5				2		1	3					3	9
ND 6993-13 Russ					3	2		4	3		3		15
Red Pontiac		1		1									2
B 5960-13													0

1 Merit Points Determined as Follows:

Merit Rating	Merit Points
1	5
2	4
3	3
4	2
5	1

2 No Data Received.

PACIFIC NORTHWEST
Aberdeen, Idaho
Joseph J. Pavék and Dexter R. Douglas

Aberdeen Greenhouses. Eighty-five tetraploid clones were crossed in 781 combinations during March and April. Most crosses were made to produce long to oblong russets, with resistance to scab and Verticillium wilt, and with medium to high specific gravity and satisfactory french fries. In addition, 16 productive diploids (haploids or DH clones) were intercrossed, and 30 4x-2x crosses were also made.

Tuber units of all but the first year selections were indexed for latent viruses with anti sera prior to planting at Tetonia. Tubers of approximately 40,000 seedlings were produced during the summer and fall.

Tetonia Station. Nine hundred and thirty single-hills were selected from 35,000; approximately 5-hills of each will be planted in 1970 at both Aberdeen and Tetonia. Seedstocks of all breeding program selections used in any trial were increased.

Aberdeen Observational trial. 1288 clones were grown in 5-hill plots; 363 were selected on tuber appearance and certain other characteristics (vine, maturity, disease reactions) for further testing. Specific gravities and french fry characteristics are being determined for each selection.

Yield Trials

Five yield trials were conducted: (1) Preliminary I (107 entries, 2 reps. of 10 hills) (2) Preliminary II (56 entries, 3 reps. of 10 hills), (3) Intermediate (49 entries), (4) Advanced (18 entries), and (5) Early Harvest (25 entries). The five trials were planted at Aberdeen May 6-13 and harvested October 6-8 except the Early Harvest trial which was harvested August 28. The Intermediate and Advanced trials were planted at Parma on April 23 and harvested October 14-15; 12 entries of the Early Harvest trial were planted at the same time at Parma and harvested on August 26. In addition, 13 entries of the Advanced trial were grown at Rupert, Idaho on an observational basis.

Russet Burbank, Kennebec, Norgold Russet, and Shoshoni were used as checks in the above trials.

The soil at each location was a silt loam, and fertilization was according to soil test results. At Aberdeen, this was 150 pounds of nitrogen and 180 pounds of phosphate applied in bands. Water was applied in furrows as needed. The rows were spaced 36 inches apart, and seed pieces were planted at 10 1/2 inch intervals at Aberdeen and at 8 1/2 inches at Parma.

Temperatures were 2 to 3 1/2 degrees above normal across southern Idaho until about June 15. Then the weather changed abruptly and temperatures averaged about 3 degrees below normal for the remainder of June and through July at Aberdeen; at Parma the temperatures were close to seasonal means for the remainder of the season. August and September mean temperatures were near normal at Aberdeen. The first killing frost occurred on October 2 at both locations.

Verticillium wilt and a late peach aphid infestation killed most clones by September 15 at Aberdeen. At Parma most clones remained green until the frost, except that 2 replicates of the intermediate yield trial were permitted to become infected with early blight, resulting in all clones being killed by September 15.

Advanced yield trial. Fourteen advanced Idaho selections and the four checks were grown in 25-hill plots, 4 replications in an RCB design at Aberdeen and at Parma. Mean total yields, percent U.S. No. 1's, and specific gravities for each location, and french fry color and tuber type are presented in P.N.W. table 1.

The Aberdeen yields were from 60 cwt (Norgold) to about 120 cwt (Russet Burbank) higher than in 1968. The Parma yields were nearly the same as in 1968. The specific gravities for Russet Burbank were .006 to .008 lower than is considered normal. Approximately 10 to 15% of the Russet Burbank had hollow heart or the browning which is preliminary to it; this apparently is a result of the very warm weather at the beginning of the season followed by abruptly cooler temperatures and two weeks of intermittent rain. By July 4, Russet Burbank tubers were about the size of walnuts and many already had hollow heart.

The top yielding entry at Aberdeen, A62180-2, was the only clone that had 98% of its stems green on October 2, just prior to the killing frost. All but A589-65 and A6135-4 were more than 95% dead at this time.

Tubers of A62180-2 from the 1968 trials made french fries of an acceptable color after two months at 40°. However, its round to slightly oblong shape precludes its use for that purpose. Preliminary testing indicates that it may be acceptable for chipping.

When all characteristics are considered, A6334-19, A6334-20 and A63126-2 appear to be the outstanding russet selections in this trial.

Intermediate yield trial. Twenty-eight selections from the 1968 preliminary trial, 15 selections from the 1968 advanced trial, 2 named varieties (Bake-King and Bintje), and the 4 checks were in this 4 replicate trial with 20-hill plots. At Aberdeen the design was a 7x7 lattice and at Parma the RCB was used. At this time only an RCB analysis has been completed on the Aberdeen data; the data are presented in P.N.W. table 2.

Two replicates of this trial at Parma were grown approximately 200 feet from the remainder of the yield trials, and were infected with early blight. The blight apparently depressed the specific gravity of most entries, but yields did not appear to be affected. Mean specific gravities for the 2 non-blighted replicates compared with the 2 blighted ones for the named varieties are as follows:

<u>Variety</u>	<u>No blight</u>	<u>Blight</u>	<u>Difference</u>
Bake-King	1.085	1.079	.006
Bintje	845	76	.0085
Kennebec	805	775	.003
Norgold Russet	74	675	.0065
Russet Burbank	84	755	.0085
Shoshoni	78	695	.0085

It is encouraging that the four top yielding clones at Aberdeen are new selections; it appears that progress in yield can easily be attained. One of these, A64140-3, was also the top yielding entry at Parma. Unfortunately its specific gravity and french fry color are poor.

Bintje yielded surprisingly well at Parma, although it did produce a great many malformed tubers. Greater attention to its irrigation probably would reduce malformation.

The percentage of U.S. No. 1 tubers averaged lower for clones with long tubers, e.g. Russet B., A63197-3, A63126-9, etc. A high proportion of the tubers were malformed, no doubt resulting from moisture stress which is difficult to prevent during hot weather.

Early Harvest yield trial. Twelve clones from the Advanced trial, 6 from the Intermediate trial, the 4 checks, and 3 clones thought to be early (A6356-6, B5446-4, and Alaska Frostless) were grown in this trial at Aberdeen. Twelve of the clones thought to be the earliest maturing of these 25 were selected for the Early Harvest planting at Parma. The results are presented in P.N.W. table 3.

A6356-6 was top yielding at both locations; it has a long, white, irregular tuber. These results indicate that clones which may be classed as late on the appearance of vines, e.g. A62180-2, may set tubers and size early.

The most outstanding clone in this trial was A63126-2. It has an attractive long russet tuber with high specific gravity and acceptable french frying quality.

Preliminary yield trials. One hundred sixty-three clones, including 3 checks, were grown in these trials only at Aberdeen. Most were selected from the 1968 5-hill observational trial. Clones with sufficient seed were placed in the 3-replicate (10-hill) trial, and the rest were planted in 2 replicates of 10 hills each. At the writing of this report, the data from these trials were not yet analyzed.

One entry, A64159-1, with very long, rough tubers, yielded at a rate exceeding 700 cwt per acre. Three other clones, one a tetraploid from a tuberosum-phureja cross, yielded at a rate above 500 cwt per acre.

Disease Resistance Evaluations

Resistance to Verticillium wilt. Verticillium albo-atrum, the causal organism of Verticillium wilt, is present in nearly all the soils of the Pacific Northwest, particularly in southeastern Idaho where it causes early dying of potatoes. This disease appears to be one of, if not the most important, limiting factor of production in this area. It is thought that in the absence of this disease, yield potential could be increased considerably.

A field of Declo silt loam at the Aberdeen Station, known to be infected with the Verticillium wilt organism, was used for the trial. All seedlings in the Advanced and Intermediate yield trials (AYT and IYT) were evaluated. These data are summarized in P.N.W. table 4. Evaluations were made on 8-25-69 and again on 9-21-69. Vines were evaluated as to maturity, percentage of plants infected,

and severity. Several seedlings, A6473-8, A6476-8, A64187-4, and A64141-7, appear to be highly resistant or have a high degree of tolerance to the disease. However, these are all late maturing seedlings. There again appears to be a direct correlation between maturity and degree of tolerance.

Resistance to Early Blight. Early blight, caused by Alternaria solani, (Ell. & Mart.) Soc. is the most common foliage disease of potatoes in the Pacific Northwest. It appears to be increasing in severity in southeastern Idaho as more land goes under sprinkler irrigation. It is especially serious on sandy land, where solid set irrigation systems are often used. Injury to the foliage is due to a leaf spot which acts as an instigator of premature defoliation or merely reduces the area of photosynthetic activity. The pathogen also incites a tuber rot, which tends to increase in severity in storage, that is of serious concern to processors.

In 1969 the seedlings from the various yield trials, along with selected named varieties and diploid seedlings, were evaluated for resistance to early blight. The test consisted of 5-hill plots replicated three times. The plot was planted on 5-21-69, with every third row being the susceptible variety, Pioneer. Inoculum, which was obtained from three different isolates grown on potato dextrose agar (PDA), was sprayed on the Pioneer spreader rows on 7-10-69. A solid set sprinkler system was installed in the field. The plot was sprinkled every third day for three hours just prior to nightfall for three weeks. The regular gravity irrigation schedule was followed throughout the growing season. The plants were evaluated on 8-13-69 and again on 8-29-69 for percentage of leaves infected, percentage of defoliation, severity, and maturity. These data are summarized in P.N.W. table 4. The tubers from one replication of the AYT trial were also sprayed with inoculum at time of harvest. After five months of storage at 45° F., these tubers will be evaluated for development of tuber rot. Several advanced selections, A62180-2, A6108-11, A6360-1, A6442-20, A62155-4, and A6473-13 showed a high degree of tolerance. Infection occurred on at least 50% of the foliage of these seedlings, but there was less than 5% defoliation. Infection appears to be quickly arrested, with the typical target spot lesions never developing. Several selections, A6371-2, A63184-6, A6334-17, A6452-6, Norgold Russet, B6116-18, A6360-2, A6414-1, B5141-6, Rushmore, and Irish Cobbler, were more than 90% defoliated by the severe blight epidemic.

Resistance to Rhizoctonia. Rhizoctonia appears to be one of the most important diseases of potatoes because of its direct effect on the growing plant and resultant effects on tuber development. The stolons and roots may be girdled, causing poor stands and single-stemmed hills, and sparse set or small tubers set high on the stems near the ground level. Seedling, and even mature plant resistance to the disease would be highly desirable.

In 1969 selected seedlings from the AYT trial were evaluated for resistance to Rhizoctonia. The test consisted of 20-hill plots replicated three times. The plot was planted 5-28-69 in a cooperating grower's field known to have a high population of the pathogen. Three hills from each entry were evaluated on 7-11-69 and on 8-20-69 for percentage of roots and stolons infected, type of lesion and severity. These data are summarized in P.N.W. table 4. Several seedlings, A6135-4, A6334-19, A59325-2, and A62180-2, showed a high degree of resistance. Approximately 10% of the stems and stolons of these seedlings were

infected as compared to more than 90% for Russet Burbank.

Resistance to Net Necrosis. In 1969 seedlings from the AYT, IYT, plus several named varieties were evaluated for resistance to net necrosis. The test consisted of 5-hill plots replicated three times. Aphids were reared in an isolation chamber on broccoli plants. Russet Burbank potato plants, grown from tubers exhibiting net necrosis, were placed in the isolation chamber next to the broccoli plants on 7-10-69. On 7-14-69 three aphid bearing leaflets from these Russet Burbank plants were placed onto the crown of each individual seedling. On 7-16-69 a foliar insecticide was applied to the plot to kill all aphids. The plot was harvested on 9-29-69 and the tubers were placed in storage at 50° F. The tubers were evaluated for percentage of tubers with net necrosis and severity on 1-28-70. These data are summarized in P.N.W. table 4. The tubers of the Russet Burbank check showed about 70 percent typical necrotic symptoms. Several of the seedlings exhibited less than 20 percent necrosis, with one seedling, A6452-6, exhibiting necrosis in only 5 percent of the tubers.

Distribution

During 1969 selections or seedlings were distributed to researchers in Arizona (Bessey), California (Corrins), Colorado (Twomey), Idaho (Dazey, Groskopp, Ohms, Parr, Robinson, Ramanko), Minnesota (Lauer), Nebraska (O'Keefe), New Jersey (Nickeson), North Dakota (Johansen), Oregon (Carter), Washington (Hoyman, Kunkel), Canada (Molnar, Johnston), Israel (Susnoschi), and Beltsville (Sanford, Sinden, and Webb). Seeds were distributed to Texas (NASA), and Canada (Molnar).

Pacific Northwest table 1. Advanced yield trial, Aberdeen and Parma, Idaho, 1969.
(4 replications of 25 hills, each location)

Clone	Aberdeen		U. S. 1		Parma		U. S. 1		Specific Gravity		Fry Color 3/	Tuber Type 4/
	U. S. 1		Rank		Total		No. 1		Ab. Parma			
	Total	Pct			Cwt		No. 1	Pct	Ab.	Parma		
A62180-2	439	91	8	64	582	91 ^{2/}	91	1.1			R-O, fl.	
A6135-4	421	81	1	78	743	83	82	1.9			O-L, buff	
A63126-3	363	70	2	64	684	73	76	2.6			L, lt. rus.	
Shoshoni	350	88	13	75	521	78	76	1.9			O, rus.	
A6356-2	339	78	6	71	614	79	86	1.6			O, rus.	
A589-65	337	55	16	62	484	87	95	2.2			O-L, lt. rus.	
Russet Burbank	336	64	12	61	525	80	82	1.1			L, rus.	
A6352-6	326	83	17	83	465	81	78	1.5			O-R, rus.	
A6371-2	317	62	5	79	619	81	91	2.2			L-O, lt. rus.	
A6371-3	304	73	11	77	555	89	91	1.4			O, rus.	
Kennebec	299	89	7	69	601	79	85	1.1			O, buff	
A59325-2	293	84	10	76	563	91	96	1.9			O-L, hv. rus.	
A6334-19	292	78	14	79	494	84	85	1.7			O, hv. rus.	
A6334-20	291	74	18	83	396	83	80	2.3			O, hv. rus.	
A6371-4	286	80	9	84	578	84	95	2.6			O-L, lt. rus.	
A63184-6	268	76	3	75	621	75	80	2.0			O-R, lt. rus.	
A63126-2	257	74	4	79	619	85	90	2.2			L, rus.	
Norgold	222	49	15	85	490	74	73	2.8			O, lt. rus.	
Mean	319	76		74	564	82	85	1.9				
LSD .05	45				121		.005	.005				

1/ Common scab disregarded.

2/ 1.0 omitted.

3/ Mean for 12 tubers, stored at 45° F.; 1.0 lightest to 5.0 darkest.

4/ R = round, O = oblong, L = long, rus. = russet, lt. = light, hv. = heavy, fl. = flaky.

Pacific Northwest table 2. Intermediate yield trial, Aberdeen and Parma, Idaho, 1969.
(4 replications of 20 hills, each location)

Clone	Tuber Yield Per Acre						Specific Gravity	French Fry Color ^{3/}	Tuber Type ^{4/}		
	Aberdeen		Parma		U. S. 1 ^{1/}	U. S. 1 ^{1/}					
	Total	Cwt.	U. S. 1 ^{1/}	Rank						Total	Cwt.
A6442-20	458	97	10	593	85	93 ^{2/}	84	1.5	R-O, buff		
A64140-3	408	66	1	752	72	76	70	3.0	O-L, rus.		
A6401-1	396	91	20	544	82	80	82	1.0	O, lt. rus.		
A64187-4	389	82	24	536	87	92	88	2.0	O, lt. fl.		
A6153-12	370	82	32	471	69	85	76	1.0	L-O, lt. rus.		
A6442-19	369	83	7	677	92	85	78	1.0	O-R, fl. rus.		
A63171-1	367	79	6	680	78	80	78	2.5	O, lt. fl. rus.		
Kennebec	363	89	4	704	78	80	79	1.3	O, buff		
Shoshoni	363	79	5	691	67	79	74	1.5	O-R, rus.		
A6371-1	360	65	23	540	71	89	84	1.0	L-O, buff		
Russet Burbank	359	63	26	523	56	81	80	1.0	L, rus.		
Bintje	346	52	3	732	34	83	81	1.0	O, buff		
A6305-8	333	71	13	568	79	80	80	2.0	L-O, rus.		
A64139-22	331	74	40	441	68	82	80	1.5	O, rus.		
A63197-3	329	56	48	341	32	74	76	1.4	L, rus.		
A6473-13	329	75	21	543	76	87	88	2.0	O-L, lt. rus.		
A63126-9	327	59	27	520	71	86	88	1.7	L, rus.		
A64139-20	324	80	35	464	85	76	70	2.1	O, lt. rus.		
A6360-1	322	76	12	572	75	80	79	4.0	O-R, lt. rus.		
C21-1	319	66	19	549	74	72	64	3.0	R, red		
A6461-5	318	70	33	468	66	80	67	2.2	O-L, rus.		
A64140-2	318	72	8	628	90	83	81	3.0	O, lt. rus.		
A62155-4	315	78	30	498	71	106	101	1.0	O-R, rus.		
A6371-5	315	82	15	564	75	84	83	2.2	O, rus.		
A63126-6	313	63	14	566	67	81	80	2.0	L, buff		

continued

Pacific Northwest table 2 continued.

A6305-20	313	80	34	466	71	72	68	3.0	O, hv. rus.
A6356-8	312	67	31	489	71	76	81	2.7	L-O, rus.
A63125-8	307	67	37	450	68	91	84	2.1	O-R, fl. rus.
A63197-1	305	57	25	533	58	80	82	1.0	L, rus.
A6473-8	304	82	9	605	82	79	89	4.5	L-O, rus.
A6473-11	302	64	38	450	72	83	76	1.5	O-R, rus.
Wn245-2	298	73	45	403	73	84	81	2.2	O-L, rus.
A6304-8	296	72	16	558	82	70	86	3.5	O, rus.
A59197-5	295	43	2	739	72	80	86	1.2	O, fl. rus.
A64206-4	295	72	11	580	76	87	79	2.8	O-L, rus.
A64141-7	295	68	22	541	78	84	86	3.2	O, rus.
A6334-17	292	66	41	437	83	83	75	2.0	O-L, rus.
A63125-5	285	46	17	556	80	82	91	1.0	L-O, rus. 5/
A6201-37	281	50	44	414	42	84	78	1.0	L, hv. rus.
A6304-4	277	87	39	445	74	80	76	2.8	O, lt. fl.
A63126-8	271	72	18	551	78	75	79	1.5	O-L, rus.
A6108-9	262	70	28	500	71	89	84	2.1	O, lt. rus.
A64139-17	251	71	43	428	75	77	77	2.0	O-L, rus.
Bake-King	241	79	29	499	88	84	82	2.7	O, lt. fl.
Norgold	210	50	36	461	81	75	71	2.8	O, lt. rus.
A6108-11	203	75	42	430	82	80	90	1.8	O, rus.
A6363-4	201	50	49	333	71	71	69	4.0	L, rus.
A6452-6	161	35	46	371	79	70	70	3.7	O, hv. rus.
A6476-8	161	35	47	365	39	81	92	1.2	L, rus.
Mean	309	70		530	72	81	80	2.1	
LSD .05	75			91		.005	.006		

1/ Common scab disregarded.

2/ 1.0 omitted.

3/ Mean for 6 tubers, stored at 45° F.; 1.0 lightest to 5.0 darkest.

4/ See 4/ P.N.W. table 1.

5/ Over 50% with jelly-end rot.

Pacific Northwest table 3. Early Harvest yield trial, Aberdeen and Parma, Idaho, 1969. (3 replications of 20 hills, Aberdeen and 3 replications of 15 hills, Parma).

Clone	Tuber Yield Per Acre					Specific Gravity	
	Aberdeen		Rank	Parma			
	Total	U. S.		Total	U. S.	Aberdeen	Parma
		No. 1			No. 1		
	Cwt.	Pct.		Cwt.	Pct.		
A6356-6	277	77	1	586	83	75 ^{2/}	92
Russet Burbank	249	66		---	--	80	--
Kennebec	248	87	5	504	76	79	72
A6352-6	228	62		---	--	76	--
A62180-2	199	59		---	--	77	--
A63126-2	193	69	7	476	78	84	96
A63184-6	187	73	2	538	85	72	81
Norgold	186	52	8	457	77	76	75
Shoshoni	180	70		---	--	67	--
A6360-1	180	71	9	450	79	75	86
Wn245-2	177	72	12	354	80	85	94
A589-65	174	38		---	--	79	--
A6371-3	171	54		---	--	85	--
A6135-4	169	78	4	508	89	74	83
A59325-2	159	58		---	--	92	--
A64140-2	150	49	3	533	86	74	96
Alaska Frostless	127	19		---	--	77	--
A6334-20	126	35		---	--	77	--
A63126-3	112	55	11	420	53	65	80
A6334-19	106	33		---	--	75	--
A6334-17	91	41	6	482	83	80	80
A6371-4	89	64		---	--	79	--
B5446-4	37	42	10	424	83	70	72
Mean	166	61		478	80	78	84
LSD .05	49			126		.010	.007

^{1/} Common scab disregarded.

^{2/} 1.0 omitted.

Pacific Northwest table 4. Disease Resistance Evaluations.

Entry	Verticillium ¹ % Infected	Verticillium ² Severity	Early Blight ³ % Leaves Infected	Early Blight ⁴ % Defoliation	Early Blight ⁵ Severity	Rhizoctonia ⁶ % Roots Infected	Rhizoctonia ⁷ % Stolons Infected	Rhizoctonia ⁸ Lesion Size	Rhizoctonia ⁹ Lesion Depth	Rhizoctonia ¹⁰ Severity	Net Necrosis ¹¹ % Tubers Infected	Net Necrosis ¹² Severity	Maturity ¹³
Advanced Yield Trial													
A589-65	19	1.6	63	25	1.9	15	9	.8	.9	.6	37	1.3	5.0
A6135-4	16	.9	38	12	1.1	23	37	.8	.9	.7	43	2.1	5.0
A59325-2	18	1.2	78	30	2.3	4	7	1.1	1.2	.7	66	2.2	4.1
A6356-2	60	2.9	40	5	1.0	4	5	.8	.7	.6	67	2.9	3.0
A6334-19	15	1.4	83	43	3.0	23	32	1.1	1.1	.8	31	2.8	4.3
A6334-20	18	1.4	83	20	1.9	15	13	.8	.8	.8	43	2.2	3.9
A6371-2	65	3.0	95	91	5.0	20	18	1.1	.9	.8	67	1.7	2.8
A6371-3	38	2.0	80	55	3.3	53	42	1.8	1.8	1.6	61	2.3	3.3
A63126-2	64	3.3	95	88	4.7	1	4	.4	.5	.3	53	1.1	2.4
A63126-3	40	2.0	78	43	2.8	85	87	2.2	2.3	2.1	53	1.0	3.8
Russet Burbank	84	3.4	88	73	4.0	88	68	2.6	2.7	2.4	73	3.3	2.8
A62180-2	6	.8	22	4	.6	57	47	1.8	1.7	1.7	69	3.5	5.0
A63184-6	85	3.6	97	90	4.7	7	7	.5	.5	.5	39	1.9	2.1
A6352-6	49	2.2	97	72	4.1						32	1.3	2.6
A6371-4	76	3.3	83	33	2.6						78	3.3	2.6
Kennebec	83	3.7	95	78	4.7						76	2.5	2.5
Norgold Russet	100	5.0	87	85	4.4						21	1.0	1.0
Shoshoni	20	1.0	78	25	2.2						44	1.9	4.2
LSD .05	20	.7	26	28	3.02	26	27	.96	.95	.81			.6

continued

Pacific Northwest table 4 continued.

Entry	<u>1/</u> Verticillium % Infected	<u>2/</u> Verticillium Severity	<u>3/</u> Early Blight % Leaves Infected	<u>4/</u> Early Blight % Defoliation	<u>5/</u> Early Blight Severity	<u>11/</u> Net Necrosis % Tubers Infected	<u>12/</u> Net Necrosis Severity	<u>13/</u> Maturity
Intermediate Yield Trial								
A59197-5	44	2.0	77	33	2.1	18	1.1	4.3
A6153-12	75	3.3	78	28	2.4	46	1.9	3.1
A62155-4	3	.6	60	2	.6	44	2.3	4.9
A6305-8	70	2.8	93	37	2.8	41	1.3	2.6
A6334-17	84	4.2	100	97	5.0	11	.6	3.1
A6356-8	35	1.8	63	18	1.7	55	2.1	3.3
A6371-1	39	2.2	95	58	3.4	72	3.4	3.1
A6371-5	38	2.1	78	8	1.0	60	3.3	3.8
A63125-5	11	.9	89	17	1.9	73	2.7	4.8
A63125-8	55	2.6	98	30	2.3	42	1.7	3.0
A63126-6	39	2.4	95	33	2.6	30	1.8	3.6
A63126-8	16	1.4	62	5	1.0	17	1.8	3.9
A63126-9	40	2.4	77	47	2.7	41	1.4	3.7
A63171-1	73	3.3	95	35	2.6	40	2.2	2.7
A6108-9	40	2.7	87	12	1.7	60	2.7	4.4
A6108-11	13	1.3	22	4	.5	19	1.3	4.9
A6201-37	66	3.1	97	45	3.0	40	3.3	3.1
A6304-4	29	1.7	97	6	1.4			2.6
A6304-8	91	4.7	80	20	1.9	33	1.9	1.6
A6305-20	45	2.5	77	17	1.5	40	2.6	2.8
A6360-1	81	3.9	43	4	.5	23	2.0	2.2
A6363-4	43	2.3	98	76	4.6	19	1.3	2.2
A63197-1	73	2.9	82	37	2.7	64	4.1	2.8
A63197-3	16	1.6	80	27	2.2	64	3.9	3.7
A6442-19	39	2.2	87	10	1.2	35	3.5	3.1
A6442-20	4	.6	50	4	.5	33	1.8	4.7
A6452-6	97	4.9	100	96	5.0	5	.5	1.3
A6461-5	6	.9	82	27	2.5	17	.9	4.4
A6473-8	1	.4	53	3	.6	48	3.1	5.2
A6473-11	18	1.3	95	22	2.2	32	1.3	3.9
A6473-13	2	.4	30	2	.4	58	3.7	5.2
A6476-8	1	.4				71	4.2	5.2
A6401-1	11	1.0	87	60	3.0	20	2.9	4.4
A64139-17	13	1.2				29	2.3	3.3
A64139-20	28	2.2	95	33	2.9	21	2.8	3.2
A64139-22	7	.9	68	8	1.3	33	1.7	4.3

continued

Pacific Northwest table 4 continued.

A64140-2	93	4.3	98	22	2.3	52	2.9	2.5
A64140-3	4	.7	78	12	1.6	44	2.7	4.3
A64141-7	1	.4	90	23	1.9	47	1.4	4.5
A64187-4	1	.4	58	5	.9	55	3.9	5.2
A64206-4	80	3.9	92	40	2.9	29	1.2	2.4
C21-1	98	4.8	98	67	4.0	74	2.3	2.6
Wn245-12	41	2.5	97	81	4.3	16	1.1	2.8
Bake-King	83	3.8	95	78	4.2	48	3.1	1.9
Bintje	60	2.9	97	73	4.0	30	2.3	3.6
Kennebec	60	3.3				59	2.7	2.8
Norgold Russet	99	5.0	93	90	4.8	14	1.0	1.5
Russet Burbank	73	3.1	93	75	4.0	60	3.3	2.8
Shoshoni	25	1.6	93	23	2.0	21	1.6	3.5
LSD .05	19	.7	20	34	1.04			.6

Preliminary Yield Trial (Selected entries)

A180-26		50	8	1.1		3.2
A466-2		72	10	1.3		3.9
A477-8		87	43	2.7		2.8
A483-6		88	27	2.6		3.0
A492-2		50	4	.8		4.1
A503-42		78	7	1.1		3.4
A535-9		70	13	1.4		3.4
A594-11		72	7	1.0		3.6
A598-101		88	37	2.5		2.7
A6056-1		87	22	2.1		3.0
A60120-1		73	10	1.3		3.9
A6126-4		85	12	1.6		3.3
A6176-7		75	6	1.0		3.5
A6201-6		80	15	1.6		3.1
A6373-1		93	33	2.5		2.9
A6360-2		100	99	5.0		3.0
A6414-1		100	96	5.0		2.7
A6439-3		100	88	4.6		2.7
A6442-9		87	27	2.4		3.3
A6473-7		77	10	1.2		3.7
A64105-6		53	5	.8		3.8
A64139-3		93	60	3.9		3.0
A64139-7		63	20	1.7		3.1
A64139-8		98	75	4.3		2.2
A64141-2		88	23	2.0		3.3
A64143-1		82	23	2.2		3.2
A64144-3		83	23	1.9		3.7
A64147-7		90	23	1.9		3.0
A64180-8		98	52	3.3		2.3
A64187-5		75	11	1.6		3.1
A64189-6		92	18	2.1		3.3

continued

Pacific Northwest table 4 continued.

Entry	Early Blight ^{3/} % Leaves Infected	Early Blight ^{4/} % Defoliation	Early Blight ^{5/} Severity	Maturity ^{13/}	Entry	Early Blight ^{3/} % Leaves Infected	Early Blight ^{4/} % Defoliation	Early Blight ^{5/} Severity	Maturity ^{13/}
A64206-5	95	20	2.2	2.7	Ackersegen	60	7	.9	3.8
A64206-7	97	42	2.7	2.6	Elenita	53	5	.9	3.9
F3279-1A	77	7	1.1	3.2	Hindenburg	73	4	.9	3.9
C21-2	100	83	4.7	2.9	Detskoselskij	100	89	4.9	2.0
C28-3	97	55	3.7	2.3	S41956	77	5	.8	3.7
B5141-6	100	92	4.8	2.5	Irish Cobbler	100	95	5.0	2.0
Russet Burbank	100	74	4.0	2.7	Katahdin	83	13	1.7	3.6
Shoshoni	97	20	2.0	3.1	88	100	100	5.0	2.0
Wn168-3	93	20	2.1	3.5	89	98	25	2.4	3.2
Rushmore	98	95	4.9	3.2	111	95	90	4.7	2.7
Norchip	100	75	4.4	2.5	93	100	37	2.8	2.9
B6097-9	100	62	3.6	2.1	97	97	35	2.7	2.9
B6116-18	100	100	5.0	2.3	95	97	47	2.8	2.9
B6138-3	90	30	2.7	2.8	99	100	98	5.0	2.3
Oromonte	70	25	2.5	3.4	100	93	25	2.1	2.8
Yampa	82	10	1.3	3.7	101	98	48	3.6	2.8
Blanca	100	72	4.0	2.3	103	90	9	1.4	3.7
A6356-9	80	23	2.1	3.8	67	100	100	5.0	2.0
Delus	95	40	2.9	2.6	497	100	100	5.0	2.0
Green Mt.	98	80	4.1	2.6	Diploid Trial				
Merrimack	90	38	2.8	2.9	W102	15	12	1.2	3.1
Ona	80	5	.8	3.2	W105	28	4	.7	4.7
Pontiac	90	47	3.2	3.8	W128	87	35	2.4	4.0
Rus. Rural	83	25	2.3	3.6	W129	67	28	2.2	3.3
Saco	90	65	4.1	2.8	W130	83	18	2.0	3.8
Seneca	97	57	3.5	3.0	W131	70	5	.7	4.2
Viking	99	23	2.4	2.9	W132	55	20	2.0	3.7
White Rose	100	94	4.9	2.8	W136	93	20	2.1	2.9
A6153-7	57	7	.9	4.3	W148	97	48	3.1	2.9
Jygeva Kollane	35	1	.6	4.6	W153	98	97	4.9	3.2
Wn245-9	98	85	4.6	2.8	W154	98	53	3.4	2.7
67-1794	100	98	5.0	2.8	W159	98	70	4.0	3.2
Dorita	100	79	3.8	2.3	67-1794	100	97	5.0	3.0
Sirtema	97	77	4.1	2.7	US-W8030.7	85	17	1.8	3.2
Ysselster	80	17	1.9	4.0	US-W8030.8	92	25	2.6	2.3
Maritta	67	17	1.1	3.5	67-1796	92	82	4.6	3.0
Falke	100	73	4.1	2.0					

continued

Pacific Northwest table 4 continued.

- 1/ Verticillium wilt, percent plants showing wilting on 8-25-69.
- 2/ Verticillium wilt vine rating, 0 = highest tolerance, 5 = lowest tolerance.
- 3/ Early blight, percent of leaves showing blight lesions.
- 4/ Early blight, percent of defoliation.
- 5/ Early blight severity rating, 1 = tolerant, 5 = severe.
- 6/ Rhizoctonia solani, percent roots showing lesions.
- 7/ Rhizoctonia solani, percent stolons showing lesions.
- 8/ Rhizoctonia solani, lesion size rating. 1 = small and localized, 3 = girdled.
- 9/ Rhizoctonia solani, lesion depth rating. 1 = superficial, 3 = very deep.
- 10/ Rhizoctonia solani severity rating, 0 = resistant, 3 = severe infection.
- 11/ Leafroll net necrosis, percent tubers showing symptoms.
- 12/ Leafroll net necrosis severity rating. 1 = very light, 5 = very dark.
- 13/ Maturity. 1 = early, to 5 = late.

ALABAMA

Sam T. Jones (deceased), J. L. Turner, Hubert Harris,
Harold Yates, J. E. Barrett, and Frank Garrett

Potato Variety Trial

Experimental Procedure. Twenty-eight varieties and breeding lines were grown a randomized complete block with four replications at the Gulf Coast Substation, Fairhope, Alabama, in 1969. Plots were two rows 25 feet long containing a total of 50 hills of potatoes. Seed pieces were 1 1/2 ounces in size and were spaced 12 inches apart. Approximately 1200 lbs. per acre of a 4-12-12 analysis fertilizer containing 2% Mg O was applied in bands to the side of the seed at planting, and 800 pounds per acre of 8-8-8 was applied as a top dressing at hilling. Yields were determined by tuber sizes. Samples of A-size tubers were brought to Auburn for specific gravity measurement and chip color analysis. Specific gravity and chip color determination were made within seven days harvest. Storage during this time was at 68° F.

Results. In general, yields were lower this year than in 1968. The two highest yielding Reds were Red LaSoda and Neb. 202.57-1. These two varieties have out performed the other entries for three years in a row.

LaChipper was the highest yielding white variety. Wisconsin 623 and Platte had good yields. Superior, Sebago, and Norgold Russet yields were on the low side. Wisconsin 629 had the best chip color of all varieties and Nebraska 49.62-5 had the highest total solids.

Alabama table 1. Performance of potato varieties, Gulf Coast Substation, Fairhope, Alabama, 1969. ^{1/}

Variety	Yield Per Acre			^{2/} Specific Gravity	Chip Color
	Grade		Total		
	A	B			
	Cwt.	Cwt.	Cwt.		
Red LaSoda	170	12	183	60	4.8
Neb. 202.57-1	162	17	180	66	3.5
LaChipper	156	20	176	66	5.5
Neb. 49.62-5	154	11	165	76	5.5
Wis. 623	149	29	179	69	7.5
Neb. 97.57-2	146	21	167	64	3.5
Platte	141	25	166	59	6.0
Wis. 560	134	28	163	73	6.0
ND5127-10R	132	23	155	68	6.5
Wis. 639	124	11	135	67	6.3
Wis. 664	121	16	137	72	6.3
Penobscot	120	11	131	70	5.0
Neb. 91.57-418	117	13	184	63	5.3
Superior	109	12	121	68	5.3
Neb. 185.57-1	107	10	117	63	2.8
ND5761-5	101	29	130	68	6.8
Norchip	101	19	120	71	8.5
Neb. 1-57-1	98	21	119	71	6.3
Sebago	91	14	105	61	7.8
Norgold Russet	88	25	114	69	4.3
Neb. 76-62-1	85	9	95	62	5.5
Neb. 92-55-76	84	25	110	71	6.3
Wis. 571	81	20	102	74	6.5
Wis. 629	81	24	105	69	9.5
ND6993-13R	73	30	103	70	7.0
ND6584-6R	65	4	70	56	5.3
Norchief	63	9	72	62	4.8
ND7196-18	36	21	57	61	6.0

^{1/} Planted 2/15/69 - harvested 6/5/69.

^{2/} 1.0 omitted.

ALASKA
Curtis H. Dearborn

Environment

Soil moisture was the lowest at Matanuska in the 52 years of station records. Sprinkler irrigation was used but was not available at the start of the season. Yields without irrigation were about 40 percent of normal. A 27° F. frost on August 11 destroyed about half of the foliage of frost susceptible potatoes.

Activities

Hybridization of Solanum species that has resulted in the commercially acceptable Alaska Frostless clone is being continued to develop clones that tuberize earlier. Toward this objective 234 clones representing 58 species obtained from IR-1 stocks less two clones lost in tillage were grown at Matanuska in 1969.

Tubers of 177 clones from the Maine-Beltsville project were grown and noted for their horticultural characteristics. Five of these were lost in tillage.

In a randomized block design 4 replicates of 48 varieties were evaluated for tuber productivity and quality. Cut tubers were planted by conventional assist-feed single row planter with cultipacker attached using 800 pounds of 8-32-16 fertilizer per acre. Plots were single row 22 hill units with seed pieces 11" apart in 36" rows.

Breeding and selecting for early tuberizing, frost resistant clones with good culinary qualities was continued. Plantings for evaluation of scab resistance were made.

Results

Seventy-four of the 232 IR-1 clones were frost resistant. All of the clones of 12 species were frost resistant: S. acaule, S. boliviense, S. chiquidenum, S. sanctae-rosae, S. sogarandinum, S. toralapanum, S. vernei, S. clarum, S. multidissectum, S. piurae, S. raphanifolium.

S. multidissectum P.I. 210044 was the most frost resistant clone tested. The resistance of some S. acaule and S. demissum was nearly as good as S. multidissectum.

All of the clones of 33 species were frost susceptible: S. berthaultii, S. brachistotrichum, S. brachycarpum, S. bulbocastanum, S. cajamarcense, S. capsicibaccatum, S. chacoense, S. fendleri, S. guerreroense, S. hjertingii, S. hougasii, S. iopetalum, S. jamesii, S. lignicaule, S. marinasense, S. michoacanum,* S. mochicense, S. morelliforme, S. multinterruptum, S. oplocense, S. pampasense, S. papita, S. pinnatisectum, S. polyadenium, S. polytrichon, S. sandemanii,* S. sparsipilum, S. spegazzinii, S. stenophyllidium, S. stoloniferum, S. sucrense, S. tarijense, S. venturii.

Tubers were initiated in 43 clones representing 15 species: S. boliviense, S. bulbocastanum, S. cardiophyllum, S. chacoense, S. fendleri, S. hjertingii, S. hougasii, S. infundibuliforme, S. kurtzianum, S. lignicaule, S. papita, S. phureja, S. pinnatisectum, S. stenotomum, S. stoloniferum.

Clones that produced seedballs are a positive guide to their behavior but clones that did not should not be assumed to be sterile in this region. Frosting could have destroyed flowers and buds of many that otherwise would have set seedballs. Some frost resistant clones produced viable pollen long after susceptible clones were killed by freezing.

Some characteristics of the 232 IR-1 clones important to plant breeders are shown in Alaska table 1. * Clones lost in tillage.

Two tuber unit plots of clones from the Maine-Beltsville project received under codes 3401 through 3578 were grown without irrigation and killed by the frost August 11. Total weight of tubers produced, total sugars and reducing sugars were determined after storage at 38° F. for 10 weeks. These measurements are shown in Alaska table 2 with some comments on pertinent horticultural features. A sample of Norchip was used for sugar comparisons.

In the replicated potato trial of 48 varieties and clones, table 3, none produced more marketable weight of tubers per acre than Alaska Frostless. Its frost resistant foliage extended its growing season so that a large proportion of the heavy tuber set reached market size. Varieties Kennebec and Peconic had numerous tubers weighing over a pound each that developed hollow-heart thus lowering the percent marketable of these varieties. Percent marketable of that grown is a very significant item in economic operations. Peconic developed raised pustules on the basal end of the tuber that resembled common scab except that the pustules were black at harvesttime. In storage they hydrate, become proliferated and are nearly brick red. Cooperative efforts with Dr. R. W. Goth are underway to determine the causal organism. Several new red-skinned selections significantly outyielded Chieftain in marketable weight and in specific gravity but these good producers are still lower in dry matter than is desired. From field plantings of 1967 crosses 76 clones were retained. Dry soil conditions disrupted scab testing. About 1400 clones of first generation tubers are on hand from 33 crosses made in 1968. Seeds from 34 additional crosses were obtained in 1969.

ALASKA TABLE 1

NOTES ON IR-1 POTATO CLONES GROWN AT MATANUSKA IN 1969 AND FROSTED
11 AUGUST AT 27°F DISTINGUISHING FROST RESISTANT FROM SUSCEPTIBLE CLONES

<i>Solanum species</i>	P.I.#	Fr. Resist.	Tubers Set	Stolon Plants	Seedballs
<i>S. acaule</i>	266386	+	-	+	+
" "	320272	+	-	+	+
" "	320273	+	-	+	+
" "	320274	+	-	+	+
" "	320275	+	-	+	+
" "	320276	+	-	+	+
" "	320277	+	-	+	+
" "	320278	+	-	+	+
" "	320279	+	-	+	+
" "	320280	+	-	+	+
<i>S. berthaultii</i>	310926	-	-	-	-
" "	310927	-	-	-	-
" "	310971	-	-	-	-
" "	WRF1727	-	-	-	-
<i>S. boliviense</i>	310928	+	+	-	+
" "	310974	+	-	-	+
" "	310975	+	-	+	-
" "	WRF1561	+	-	-	-
<i>S. brachistotrichum</i>	320265	-	-	-	-
<i>S. brachycarpum</i>	243344	-	-	-	-
" "	275180	-	-	-	-
" "	275183	-	-	-	-
" "	275261	Slight	-	-	-
<i>S. brevicaule</i>	310930	-	-	-	+
" "	310931	-	-	-	+
" "	310982	+	-	-	+
<i>S. bulbocastanum</i>	275185	-	+	-	-
" "	275187	-	+	-	-
" "	275188	-	-	-	-
" "	275192	-	+	+	-
" "	275193	-	+	-	-
" "	275194	-	+	-	-
" "	275195	-	+	-	-
" "	275196	-	-	-	-
" "	WRF1565	-	-	+	-
<i>S. cajanarcense</i>	310988	+	-	-	-
<i>S. canasense</i>	246533	+	-	-	+
" "	265864	+	-	-	-
" "	283073	+	-	+	+
" "	283074	+	+	-	+
" "	283080	-	-	-	-
" "	310955	+	-	-	-
<i>S. capsicibaccatum</i>	205560	-	-	-	-

continued

<i>S. cardiophyllum</i>	255319	-	+	-	-
" "	255520	-	-	-	-
" "	275212	+	+	-	-
" "	275214	-	-	-	-
" "	275216	-	+	-	-
" "	WRF276	-	-	-	-
<i>S. chacoense</i>	320282	-	+	+	-
" "	320283	-	+	+	-
" "	320284	-	+	-	-
" "	320285	-	+	-	-
" "	320286	-	-	-	-
" "	320287	-	+	-	-
" "	320288	-	+	-	-
" "	320289	Slight	+	-	-
" "	320290	-	-	-	-
" "	320291	-	-	-	-
<i>S. chiquidenum</i>	275269	+	-	-	-
" "	310942	+	-	-	-
" "	310989	+	-	-	-
<i>S. clarum</i>	283099	+	-	-	-
<i>S. demissum</i>	230589	+	-	-	+
" "	230590	+	-	-	-
" "	230591	+	-	-	-
" "	275206	+	-	-	+
" "	275207	-	-	-	-
" "	275208	+	-	-	+
" "	275209	+	-	-	+
" "	275210	+	-	+	+
" "	275211	+	-	-	+
" "	310967	+	-	-	+
<i>S. fendleri</i>	255531	-	-	-	+
" "	275159	-	-	-	+
" "	275165	-	-	-	+
" "	275167	-	-	-	+
" "	283100	-	+	-	+
" "	283101	-	-	-	-
<i>S. gandarillasii</i>	218220	+	-	-	-
" "	265866	-	-	-	-
" "	283076	-	-	-	-
<i>S. gourlayi</i>	320340	+	-	-	+
" "	320341	Slight	-	-	-
<i>S. guerreroense</i>	161727	Slight	-	-	-
" "	161730	-	-	-	-
<i>S. hjertingii</i>	186559	Slight	-	-	-
" "	186560	Slight	-	-	-
" "	251065	Slight	+	-	-
<i>S. hougasii</i>	WRF391	Slight	-	-	-
" "	WRF1569	Slight	+	+	-
" "	WRF1736	Slight	-	+	-

continued

<i>S. infundibuliforme</i>	275146	Slight	+	+	+
" "	283077	+	-	+	+
" "	320295	+	-	-	+
<i>S. iopetalum</i>	275181	-	-	-	-
" "	275182	-	-	-	-
<i>S. jamesii</i>	275169	Slight	-	-	-
" "	275265	-	-	-	-
<i>S. kurtzianum</i>	320271	Slight	+	-	-
" "	320296	+	-	-	-
" "	320297	Slight	-	-	-
<i>S. leptophyes</i>	310932	+	-	+	-
<i>S. lignicaule</i>	275273	-	-	-	-
" "	310993	-	+	-	-
<i>S. marinasense</i>	310944	Slight	-	-	-
" "	310945	Slight	-	-	-
" "	310946	Slight	-	-	-
" "	310947	Slight	-	-	-
" "	WRF1533	Slight	-	-	-
<i>S. medians</i>	265872	+	-	-	-
" "	283081	+	-	-	-
" "	WRF1575	-	-	-	-
<i>S. megistacrolobum</i>	233124	-	-	-	-
" "	233125	+	-	+	-
" "	265873	+	-	+	+
" "	275147	+	-	-	+
" "	275148	+	-	-	+
" "	275149	+	-	-	+
" "	320302	+	-	+	-
" "	320303	+	-	+	-
<i>S. michoacanum*</i>	255537	No plants			
" "	255542	-	-	-	-
" "	283065	Slight	-	-	-
<i>S. microdontum</i>	320304	-	-	-	-
" "	320305	-	-	-	-
" "	320306	-	-	-	-
" "	320307	-	-	-	-
" "	320309	-	-	-	-
" "	320310	-	-	+	-
" "	320311	-	-	-	-
" "	320312	-	-	-	-
" "	320314	-	-	-	-
" "	320315	-	-	-	-
<i>S. mochicense</i>	283114	-	-	-	-
<i>S. morelliforme</i>	275223	-	-	-	-
<i>S. multidissectum</i>	210043	+	-	+	-
" "	210044	+	-	+	-
" "	210055	+	-	+	-
" "	265876	+	-	+	-
" "	296123	+	-	+	-
<i>S. multiinterruptum</i>	265886	-	-	-	-
" "	275272	-	-	-	-

continued

Alaska Table 1 continued

S. oplocense	265885	-	-	-	-
" "	320322	-	-	-	-
S. pampasense	275274	-	-	-	-
" "	275275	-	-	-	-
S. papita	249929	-	-	-	-
" "	251740	-	+	-	-
" "	251741	-	-	-	-
" "	262895	-	+	-	-
" "	283102	-	-	-	-
" "	283143	-	-	-	-
S. phureja	320348	-	+	-	-
" "	320349	Slight	-	-	-
" "	320350	+	+	-	-
" "	320351	Slight	+	-	-
" "	320352	-	-	-	-
" "	320353	Slight	+	-	-
" "	320354	Slight	-	-	-
" "	320355	+	+	-	-
" "	320357	-	-	-	-
" "	320358	-	-	-	-
S. pinnatisectum	275230	-	+	-	-
" "	275232	-	+	-	-
" "	275234	-	+	-	-
" "	275236	-	+	-	-
S. piurae	310997	+	-	-	-
S. polyadenium	310988	-	-	-	-
" "	320342	-	-	-	-
S. polytrichon	255522	-	-	-	-
" "	255545	-	-	-	-
" "	255546	Slight	-	-	-
" "	255547	-	-	-	-
" "	275240	-	-	-	-
" "	275241	-	-	-	-
S. raphanifolium	210048	+	-	-	-
" "	265862	+	-	+	+
" "	296126	+	-	-	-
" "	310951	+	-	-	-
" "	320262	+	-	-	-
S. sanctae-rosae	320324	+	-	-	-
" "	320225	+	-	-	-
S. sandemani*	265880	No plants	-	-	-
S. sogarandinum	230510	+	-	-	-
S. sparsipilum	265859	-	-	-	-
" "	265871	-	-	-	-
" "	310929	-	-	+	-
" "	310972	-	-	+	-
" "	310984	-	-	-	-
S. spogazzinii	310985	-	-	+	-
" "	320299	-	-	+	-
" "	320300	Slight	-	-	-

continued

ALASKA TABLE 2
CHARACTERISTICS OF MAINE-BELTSVILLE POTATO CLONES GROWN AT
MATANUSKA IN 1969 AND EVALUATED AFTER 10 WEEKS STORAGE AT 38°F

Potato Seedling number	Total weight	Percent Total sugars	Percent Reducing sugars	Comments
3401	2.1	6.9	4.0	
3402	1.9	7.5	4.0	
3403	1.8	5.5	2.5	Red Skin
3404	1.5	6.0	4.0	
3405	2.0	7.0	2.0	Considerable Feathering
3406	5.9	5.4	2.0	
3407	1.3	6.0	3.0	1 Hollow
3408	3.3	6.9	4.0	
3409	.9	8.5	3.0	
3410	3.6	6.1	5.0	Feathering
3411	2.3	7.3	4.0	
3412	2.7	6.0	4.0	
3413	2.6	7.7	5.0	
3414	2.5	8.9	5.0	
3415	3.8	7.0	2.5	
3416	2.4	6.3	4.0	
3417	3.3	5.4	1.0	
3418	3.6	5.2	1.0	
3419	3.8	6.2	1.0	
3420	2.2	8.2	1.0	Russet Skin
3421	3.1	7.2	5.0	
3422	5.9	7.8	1.5	
3423	3.8	6.4	2.0	
3424	3.6	8.4	1.0	
3425	5.1	7.2	2.0	
3426	3.6	7.2	1.0	
3427	3.8	6.8	4.0	
3428	2.2	7.2	4.0	
3429	1.4	6.2	.75	Russet Skin
3430	.8	6.8	1.0	
3431	4.4	6.9	5.0	Scab
3432	3.0	7.3	5.0	
3433	2.4	7.3	5.0	
3434	No Tubers			
3435	2.8	8.2	5.0	
3436	.8	7.0	4.0	
3437	2.8	8.3	2.0	
3438	.5	6.8	3.0	
3439	2.0	6.9	3.0	
3440	.9	7.3	5.0	
3441	1.2	5.8	4.0	
3442	.1	8.0	3.0	

continued

3443	2.6	6.8	4.5	
3444	3.2	7.0	4.0	
3445	.7	7.4	5.0	
3446	1.6	6.8	1.0	
3447	2.7	6.0	3.0	
3448	4.4	6.8	4.0	
3449	2.1	7.4	4.0	
3450	No Tubers			
3451	4.0	6.3	3.0	
3452	3.8	9.0	5.0	
3453	3.6	6.0	2.0	
3454	3.1	7.0	5.0	
3455	3.4	7.0	5.0	Nice Tubers
3456	3.1	5.0	3.0	Hollow
3457	4.9	6.1	4.0	
3458	2.8	6.9	4.0	
3459	3.5	5.3	2.0	Growth Cracked
3460	2.7	5.7	5.0	
3461	1.3	6.8	4.0	
3462	3.5	7.1	2.0	Severe Feathering
3463	3.8	6.0	3.0	
3464	.9	8.2	5.0	
3465	1.9	7.0	4.0	Feathering
3466	2.4	8.0	5.0	Feathering
3467	.4	7.8	5.0	
3468	2.6	7.2	3.0	
3469	1.5	7.0	3.0	
3470	2.3	7.9	3.0	
3471	1.4	6.9	5.0	Tender, Pink Skin
3472	No Tubers			
3473	2.6	6.9	5.0	
3474	1.9	5.1	2.0	
3475	.7	6.4	3.0	
3476	.8	7.7	4.0	
3477	5.1	6.5	4.0	Feathering
3478	2.2	6.8	2.0	
3479	2.7	8.0	5.0	
3480	4.0	6.1	2.5	
3481	3.0	6.8	2.0	
3482	2.8	6.7	4.0	Growth Cracked, Hollow
3483	2.3	8.0	3.0	
3484	2.4	7.0	1.0	
3465	3.6	6.8	4.0	
3486	4.5	8.0	3.0	Feathering
3487	2.1	6.8	3.0	
3488	1.9	6.9	3.5	Red Skin
3489	2.5	6.7	4.0	Russet, Growth Cracked
3490	2.9	6.9	2.5	
3491	1.8	6.2	2.0	Russet Skin, Pink Eyes
3492	3.6	6.4	2.0	

continued

3493	3.5	6.2	4.0	Russet Skin (Tender)
3494	1.0	6.2	1.0	
3495	1.4	6.6	3.0	
3496	3.6	7.0	3.0	
3497	1.2	6.0	1.0	Red Skin (Feathering)
3498	3.3	6.6	1.0	Hollow
3499	1.7	7.8	1.0	
3500				
3501	3.1	7.8	1.0	Feathering
3502	2.3	7.4	2.0	
3503	1.4	8.4	4.0	
3504	1.3	6.8	1.0	
3505	2.7	7.2	4.03506	
3506	3.2	7.2	3.0	
3507	3.8	7.0	1.5	
3508	4.5	7.6	2.0	
3509	4.0	6.8	2.0	
3510	4.3	6.6	1.0	
3511	1.6	7.2	5.0	
3512	.1	6.2	2.0	
3513	3.9	6.6	2.0	
3514	2.3	8.0	2.0	
3515	1.6	7.2	1.0	
3516	2.3	7.0	5.0	
3517	2.1	7.2	3.0	
3518	3.3	7.8	4.0	
3519	2.1	7.2	2.0	
3520	5.6	7.2	2.0	
3521	1.0	6.0	.75	
3522	3.2	7.2	1.0	Growth Crack
3523	1.1	6.2	2.0	Growth Crack
3524	.8	7.2	2.0	
3525	2.1	8.0	5.0	Growth Crack
3526	2.5	6.8	.5	
3527	3.5	6.0	.75	
3528	2.4	7.0	2.5	Feathering
3529	1.9	7.0	2.0	
3530	1.7	5.8	1.5	
3531	2.5	6.4	4.0	
3532	2.2	6.6	1.0	Feathering
3533	1.5	6.4	1.5	
3534	3.6	6.4	1.0	
3535	2.7	5.2	2.5	
3536	3.5	7.0	2.5	
3537	6.8	5.4	1.0	
3538	5.6	6.8	4.0	
3539	3.5	6.4	5.0	
3540	1.6	8.4	5.5	
3541	.7	7.2	1.0	
3542	.4	8.0	5.0	Russet Skin
3543	2.4	8.2	5.0	
3544	3.9	7.2	3.0	

Alaska Table 2 continued

3545	2.6	7.6	5.0	
3546	1.6	5.8	3.0	
3547	2.6	6.8	3.0	
3548	1.3	8.8	4.0	
3549	1.8	9.0	3.0	
3550	2.1	7.2	1.0	Shatter Crack
3551	.1	7.6	5.0	
3552	2.5	7.2	1.0	Feathering
3553	1.7	8.2	4.0	
3554	.8	7.6	3.0	
3555	2.1	7.8	4.0	Feathering (Sh.Cr.)
3556				
3557	1.6	6.2	.75	
3558	.3	6.8	1.0	
3559	1.1	8.6	1.0	Feathering
3560	1.7	8.0	1.5	
3561	1.4	8.6	3.0	
3562	2.1	7.2	2.0	
3563	1.6	8.4	1.0	
3564	1.8	7.8	3.0	
3565	2.1	8.4	4.0	
3566	1.3	8.6	2.0	
3567	1.0	7.4	1.0	Growth Crack
3568				
3569	4.6	8.0	2.0	
3570	3.4	8.2	1.0	
3571	1.1	8.8	4.0	
3572	2.1	7.0	1.0	Feathering
3573	1.0	6.8	1.0	
3574	2.1	7.3	3.0	Dark Russet (Tender)
3575	.4	6.1	5.0	Dark Russet
3576	1.3	6.1	5.0	
3577	.7	9.2	4.0	
3578	.7	5.9	4.0	
Norchip	4.0	7.1	2.5	

Alaska table 3. Yield, No. 1's as percent of total, specific gravity and skin color of potatoes grown at Matanuska, 1969.

Variety	Yield Per Acre		Specific Gravity	Skin Color
	U.S. No. 1			
	2" to 3 1/2"			
	Cwt.	Pct.		
Alaska Frostless	345	89	1,078	white
37-65-5-67	340	77	74	red
37-65-7-67	306	83	74	red
37-65-6-67	300	84	73	pink
Kennebec	294	81	72	white
Green Mountain	290	68	78	white
Peconic	284	67	79	white
4-58-3-66	283	83	82	white
37-65-4-67	282	77	73	red
11-65-5-67	276	84	70	pink
9-60-2-6	269	81	81	white
37-65-2-67	269	72	76	red
Alaska 114	268	88	74	white
4-58-5-66	257	80	85	white
3-58-6-66	254	74	79	white
37-65-1-67	250	60	76	red
3-58-8-66	244	84	82	white
Ontario	244	81	67	white
11-57-1-59	237	75	84	lt. red
2-65-18-67	234	77	77	lt. red
28-65-8-67	233	79	89	white
Chieftain	225	61	64	red
41-65-4-67	222	72	84	white
4-58-15-66	218	76	73	white
41-65-9-67	218	62	75	white
Alaska Russet	215	73	77	russet
41-65-1-67	214	59	74	white
2-65-23-67	208	70	80	pink
4-58-9-66	202	76	90	white
Stately	200	80	85	white
2-65-15-67	197	71	78	lt. red
23-65-3-67	190	47	81	white
Lenape	186	59	88	white
9-58-4-66	183	77	80	white
9-58-12-66	180	77	85	white
1-62-90-64	179	88	93	white
41-65-7-67	177	52	73	white
6-64-1-66	172	70	95	white
20-65-9-67	161	68	74	white
1-62-115-64	153	63	78	white
12-65-7-67	152	61	76	white
168-3	146	70	81	russet
35-65-5-67	134	67	81	white
27-65-6-67	126	58	82	white
28-65-6-67	105	74	81	white
35-65-1-67	96	67	76	white
41-65-2-67	83	24	69	white
38-65-3-67	10	3	73	white
LSD 5%	47		.004	
1%	71		.007	

CANADA
G. R. Johnston

Ontario Regional Potato Variety and Adaptation Trials
1969

In 1969 the Ontario regional potato trials were conducted at seven cooperating stations. Twelve varieties were grown in replicated, standard, randomized plots at all seven stations. Some stations included a few additional varieties. Included were three standard varieties for comparison--Irish Cobbler, Kennebec, and Sebago. Tuber samples from each variety from each location were processed for culinary quality. Specific gravity, boiling and baking tests were conducted in the Potato Quality Laboratory, Horticulture Science Department, University of Guelph. Chipping and french frying tests, following two storage treatments, were done at the Food Processing Laboratory, Smithfield Experimental Farm, Canada Department of Agriculture, Trenton, Ontario. In addition, limited tests of the processing potential of advanced clones were carried out in cooperation with Hostess Food Products, Preston and the Campbell Soup Co. Ltd., Brampton, Ontario.

Potato adaptation trials were conducted at seven stations in 1967. These were mainly grown in single-row plots varying in length from one hill for Fredericton pre-selected, second clonal (field) generation seedlings and University of Guelph first clonal generation seedlings, to 30 hills for more advanced material. Some stations conducted replicated trials of their more promising advanced lines and used several dates of harvesting during the growing season to check on tuber sizing and the accumulation of total solids (as indicated by the specific gravity ratio). At the third clonal generation stage, separate seed increase plots are maintained at Preston. These are vinekilled in late July. This procedure helps to minimize the spread of aphid-transmitted viruses.

Horticultural Research Station, Preston, Ontario.

The relatively cool temperatures and near-adequate water via irrigation facilities resulted in good yields and relatively good quality at this location. There were 9 entries in the Regional trial in comparison with 3 standards. Wauseon performed well again. Since it is now temporarily licensed it should be continued in the zonal trials only. If Peconic performed as well at other locations as at Preston it would be worthy of a temporary license. Chieftain is an attractive red-skinned variety with good yielding ability. It is suitable as a tablestock variety but not as a processor. Monona makes light-colored chips consistently from controlled storage temperatures (over 52° F. or 45° plus conditioning at 70°) but this is its principal attribute.

An Eastern Canada Merit trial was grown at Preston as well as at La Pocatiere, Quebec and Fredericton, N.B. Eleven of Eastern Canada's most promising advanced clones were grown in comparison with Kennebec. At Preston, F6151 and F6117 outyielded Kennebec but their cooking and frying quality were not equal to the maincrop standard variety. Wauseon performed well in this trial also. Chieftain had a good yield of attractive, red-skinned tubers. F6119 made light-colored chips as did Monona but both had only fair yields when compared to Kennebec.

Some promising clones were apparent in the Advanced Adaptation (replicated) trial at Preston. Worthy of advancement to the Ontario Regional Trial of 1970 at all locations are: Gbr631-1, 4407-1, B5282-13, B5236-8, F6367 and B5415-6. Their attributes are given in the Preston table containing the entries of the Advanced Adaptation trial. One other clone in this trial warrants special mention--G6549-7. A 40-pound sample of tubers was test processed by a commercial concern. The resulting french fries and potato mash were given rather high ratings. This seedling, on August 18 at Preston, yielded 384 cwt. per acre of tubers over 1 7/8" in diameter, and had a specific gravity of 1.090, compared to Kennebec at 394 cwt. per acre and 1.075. G6549-7 will be grown in a Block trial at Preston in 1970 for further processing tests as well as being multiplied.

The retained seedlings from the less advanced Adaptation trials at Preston are listed in tabular form along with their performance notes and ratings. The greatest percentage of these are Fredericton-bred. Preston receives and tests most of the second generation clones resulting from the first generation screening of the seedling production of the National Breeding Program centered at Fredericton, N.B. In 1969, 1527 second generation clones were received and grown. Of these, 305 or approximately 20% were retained for retrial in 1970. The remainder of the clones in Adaptation trial are from breeding programs in other parts of Canada (e.g. Brooks, Alberta), the USDA or from the limited Guelph program.

Horticultural Research Institute of Ontario's Organic Soil Research Station, Bradford, Ontario.

The relatively cool growing season and lots of sunshine produced very vigorous and a heavy set of tubers. As mentioned above, a better supply of water may have improved the tuber sizing. The quality, as indicated by the specific gravity ratios, was better than usual. The 9 entries compared to three standards were the same as for the other six Ontario locations. The clones with the best overall merit in this trial in order were: Wauseon, Peconic, Chieftain and F5647. However, none of these outyielded Kennebec but all produced tubers of more desirable tablestock size and appearance. Since marsh-grown, red-skinned potatoes receive a premium from the tablestock packers of this area, then Chieftain may merit temporary licensing.

Two potato clones from the Bradford Advanced Adaptation Replicated trial merit inclusion in the 1970 Ontario Regional trial. These are Gbr631 and 4407-1. Three clones are worthy of further replicated trial at Bradford--F5994, Fbr4384-18 and G644-2. F5994, which has been very promising in organic soil tests in Quebec, is an attractive, high-yielding clone at Bradford but the specific gravity (1.063) is rather low.

In the less advanced Adaptation plots at Bradford two seedling clones appear to be very promising for processing into chips and possibly also for french fries. These are G6546-6p and G6551-7y. Unfortunately the former has purple skin, which is a great disadvantage for abrasive peeling. The latter has yellow skin and pale yellow flesh. Both produce smooth, well-sized, oblong tubers and both had 1.098 specific gravity. Both produced light colored chips at Hostess from 45° F. storage, conditioned 1 week at 70°.

KEY TO THE RATINGS USED IN ALL TABLES FOR VINE, TUBER AND CULINARY CHARACTERISTICS

<u>Maturity (Vines)</u>	<u>Type</u>	<u>Plant Vigor</u>
1 - very early	1 - round	1 - very weak
2 - early	2 - oval	2 - weak
3 - medium	3 - oblong	3 - moderate
4 - late	4 - long	4 - strong
5 - very late		5 - very strong
<u>Appearance</u>	<u>Eye Depth</u>	<u>Yielding Ability</u>
1 - excellent	1 - shallow	1 - high
2 - good	2 - medium	2 - medium
3 - fair	3 - deep	3 - low
4 - poor		

Type of Scab

- 1 - small, superficial pustules
- 2 - larger, superficial
- 3 - large, rough or corky
- 4 - small, shallow pits
- 5 - large, deep pits

Amount of scab is expressed in percent of area affected.

Culinary Ratings

<u>Boiled</u>	<u>Texture</u>	<u>Baked</u>
40	Very mealy	45
0	Very soggy	0
	<u>Color</u>	
30	Uniformly white, creamy or yellow	30
0	Overall darkening or severe stem-end darkening	0
	<u>Flavor and Aroma</u>	
20	Pleasant, mild, natural	25
	Unpleasant, strong, off-flavor	0
	<u>Sloughing</u>	
10	None	not
0	Severe	<u>rated</u>
100		100

Ontario table 1. Potato variety or seedling performance notes

Location: Preston Hort. Research Station		Year: 1969	Planted: May 13-14	Harvested: September 9-10				
VARIETY OR SEEDLING	VINES		TUBER CHARACTER- ISTICS		SPECIFIC GRAVITY-1.0	REMARKS		
	MATURITY	PLANT VIGOR	TYPE	APPEARANCE			EYES-DEPTH	YIELDING ABILITY
Irish Cobbler	2	3½	1	3½	3	2½	76	Irregular, fairly rough tubers. Scab - 4/2&3. Cobbler is the early check variety.
Kennebec	3½	4	2&3	3	1	1	83	Maincrop check variety. Good yield of well-sized, sl. irregular tubers 5% of silver scurf, scab - 5/2 and moderate harvest skinning.
Sebago	5	4	1&3	2	1	1½	77	Late-maturing check variety. Bright, uniform, fairly clean tubers. Scab - 5/2, mostly at lenticels. Some harvest skinning.
WC230-14*	3½	4	3&4	1	1	1	75	Very smooth, clean, well-sized tubers with excellent net on skin. A little second growth as small sprout tubers at "eye" end of occasional tuber. <u>Promising.</u>
DT6063-1R	4	4	1	1	1½	2	75	Medium set of well-sized, uniform, mostly round, red-skinned tubers. Red skin color persists in storage. <u>Promising.</u>
BR5948-1	3	4	1	2½	1	1	95	Round, fairly uniform tubers with generally clean skin. Processing prospect for french fries and mashed potato product. USDA reports it resistant to A,X,LR,LB and scab. High yielding.
B6024-3Ru	3	4	3	1	1	1	90	Smooth, well-sized, very clean, russeted tubers (skin is more flaked than netted). Baker and french fry type, size and S.G. USDA reports it resistant to A,X,Y and LB (late blight).

continued

Ontario table 1 continued.

B6097-9	4	$4\frac{1}{2}$	2&3	2	1	1+	87	Oval to oblong, fairly uniform, well-sized tubers with smooth, clean skin. Sprouts a little early in 45° F. storage. French fry type.
B6139-11	4	4	1	3	1	1	90	Fairly uniform tubers with adhering stolons. Scab - 5/2. Resistant to A,X,LB (USDA).
B6140-3	$3\frac{1}{2}$	$3\frac{1}{2}$	1	1	1	$1\frac{1}{2}$	92	Very smooth, very clean tubers with very lightly netted tan skin type. Attractive tubers of french fry and baker type.
F5459	4	4	1&3	3	1	1	100	Late sizing, irregular, pointed but clean tubers that skinned moderately at harvest. A processing type of high S.G.
A6201-6 (Idaho)	$4\frac{1}{2}$	4	3	2	1	2	72	Medium set of well-sized, clean, sl. irregular tubers with medium net on skin. Similar to Netted Gem in conformation but much less off-type. Resistant to scab and moderately resistant to Verticillium wilt (VW).
A6334-20	$4\frac{1}{2}$	4	3&4	$2\frac{1}{2}$	1	2	75	Sl. irregular, oblong to long tubers with excellent net on skin. No knobs or 2nd growth. Some harvest skinning. Highly resistant to scab.
A6334-19	4	4	3&4	2	1	2	68	Low set of medium-sized, very smooth, oblong to long tubers with very good net on skin. Very clean. No knobs or off-types. Highly resistant to scab. Moderately resistant to VW and early blight (EB).
Alamo	3	4	1&3	3	1	2	64	Early sizing, clean but irregular tubers.
BR5967-7	$3\frac{1}{2}$	$3\frac{1}{2}$	3	3	1	2	79	Well-sized but somewhat rough tubers with a few knobs. Scab - 4/2&4. Being tested by a processor as a potential french frier.
B6376-6	3	4	1	1	1	2	81	Medium yield of round, clean, uniform tubers.
BR6290-3	3	4	1&3	2	2	$1\frac{1}{2}$	85	Well-sized, fairly uniform tubers. 5% of russet "scab."

Ontario table 2. The tuber sizing and specific gravity readings of advanced potato clones, harvested at three dates at Preston, Ontario, in 1969.

- A. Mean number of tubers per hill, 1-7/8 inches and over.
 B. Mean yield of tubers, 1-7/8 inches and over, in cwt. per acre.
 C. Mean specific gravity readings.

Variety	Vine Maturity	Harvest Dates			Remarks
		July 22	Aug. 18	Sept. 8	
Irish Cobbler	Early 2*	A 5.6	6.1	6.2	Standard early. Maximum yield by August 18.
		B 184	341	337	
		C 1.069	1.075	1.075	
Gbr631-1	Medium 3	A 4.6	6.6	6.7	Smooth, scab-free tubers. Maximum yield by late August. 1970 Reg. Trial.
		B 171	409	426	
		C 1.066	1.071	1.071	
Gbr597-10	Medium- early 2 1/2	A 4.9	6.5	6.5	Not equal to Gbr631-1. Discard.
		B 166	283	309	
		C 1.066	1.067	1.069	
ND6997-6Ru	Early 2	A 5.2	5.2	5.6	Netted type that sizes medium-early. Low S.G. Future - questionable.
		B 310	317	386	
		C 1.067	1.066	1.065	
ND6925-13Ru	Medium- early 2 1/2	A 5.2	6.1	6.0	Excellent netted type but yield is only fair. Discard.
		B 140	269	267	
		C 1.068	1.070	1.073	
G6442-2	Medium- early 2 1/2	A 5.0	5.8	6.3	Susc. to scab and very susc. to silver scurf. Discard.
		B 172	385	378	
		C 1.070	1.072	1.070	
G6560-8	Medium- early 2 1/2	A 5.6	6.0	6.3	Very susc. to scab and silver scurf. Discard.
		B 209	340	363	
		C 1.072	1.072	1.068	
4239-16	Medium- early 2 1/2	A 4.8	5.7	5.5	Scurfy skin type. Smoother than Cobbler but only fair yield. Discard.
		B 166	323	306	
		C 1.064	1.070	1.074	
G6443-12R	Medium- early	A 4.9	5.1	5.1	Early-sizing, pink-skinned seedling. Vines very susc. to V. wilt. Discard.
		B 200	389	286	
		C 1.069	1.068	1.068	
G6549-7	Medium 3	A 4.6	5.6	5.4	Sized by mid-Aug. High S.G. Smooth, well-sized oblong. Fr. fry type.
		B 149	384	371	
		C 1.077	1.090	1.091	

continued

Ontario table 2 continued.

F6345	Medium 3	A 3.3 B 121 C 1.071	5.7 379 1.086	5.5 402 1.085	Oblong, smooth, scab-free. French fry potential.
4402-4	Medium 3	A 4.0 B 103 C 1.071	7.1 341 1.087	6.9 390 1.081	Round to oblong, well-sized. Chip and fr. fry prospect.
4278-8	Medium- early 2 1/2	A 4.5 B 131 C 1.069	5.9 302 1.074	5.6 297 1.072	Early sizing. Scab-free. Yield comparable to Cobbler. Future?
4407-1	Late 4	A 5.1 B 164 C 1.070	6.1 409 1.079	6.2 412 1.082	Good yielder. Very promising on organic soil. 1970 Reg. Trial.
Neb.396.55-3	Medium- late 3 1/2	A 3.1 B 83 C 1.054	6.6 360 1.070	6.7 461 1.072	High yield potential. Red skin. Repeat in Replic. Adapt. Trial at Preston and Bradford.
4415-11	Medium- early 2 1/2	A 5.8 B 192 C 1.067	6.1 357 1.071	5.9 343 1.071	Scab-free. Sizes early. Irregular shape. Discard.
Kennebec	Late 4	A 4.5 B 164 C 1.063	6.3 394 1.075	6.6 461 1.081	Standard maincrop. Good yield by August 18.
B5282-13	Medium- early 2 1/2	A 5.9 B 217 C 1.067	6.1 371 1.073	6.0 373 1.071	Scab-resistant, smooth, early sizer. 1970 Reg. Trial.
B5236-8	Medium 3	A 4.3 B 193 C 1.059	4.4 340 1.070	5.1 396 1.070	Very resistant to Vert. wilt and scab. Early sizer. Smooth tubers. 1970 Reg. Trial.
B5415-6	Late 4	A 5.0 B 182 C 1.061	6.4 440 1.076	6.5 517 1.079	Vert. wilt res., high yielding. Round, smooth, clean tubers. Very vigor- ous vines. Very promising. 1970 Reg. Trial.
B5458-6Ru	Medium- early 2 1/2	A 3.2 B 114 C 1.065	5.3 286 1.072	4.9 276 1.070	Excellent net on skin. Very susc. to Vert. wilt. Low yield. Discard.
B6138-3p	Late 4	A 3.4 B 87 C 1.070	7.2 344 1.091	7.0 392 1.089	High S.G. Late sizer. Purple skin. Cobblerish. Make very light-colored chips. Future?
F6367	Medium 3	A 5.5 B 215 C 1.065	5.7 340 1.070	5.7 355 1.069	Medium yielder. Oblong, well-sized tubers. Makes light-colored chips. Summer chipper?
Variety means		A 4.7 B 162 C 1.067	6.0 354 1.075	6.4 374 1.071	*numerical rating of vine maturity: 1-very early;5-very late. Actu- ally a rating of 4 is considered to be "maincrop" in Ontario.

Ontario table 3. Yields and specific gravities for twelve varieties of potatoes at six locations in the Ontario Regional variety trial in 1969.

Varieties	Marketable Size Yields (2 1/4 - 3 1/2") in Cwt/Acre and Specific Gravities						
	Harrow	Simcoe	Preston	Bradford	Smithfield	Fort William	Variety Means
Kennebec	253 1.074	153 1.077	399 1.088	371 1.069	270 1.079	283 1.085	288 1.078
Sebago	201 1.070	76 1.070	376 1.080	301 1.065	219 1.084	296 1.074	244 1.073
Chieftain	150 1.064	184 1.064	370 1.072	300 1.064	211 1.073	323 1.076	256 1.068
Wauseon	173 1.068	169 1.074	332 1.078	319 1.063	233 1.078	327 1.080	258 1.074
B5267-2	161 1.067	169 1.073	344 1.075	337 1.066	151 1.075	274 1.082	239 1.073
B5236-21	147 1.062	113 1.067	362 1.071	364 1.060	187 1.071	279 1.077	242 1.068
Peconic	172 1.079	43 1.078	366 1.084	341 1.076	185 1.088	242 1.088	224 1.082
F5647	175 1.068	136 1.071	323 1.076	300 1.068	141 1.066	187 1.084	210 1.072
ND6127-10R	110 1.056	144 1.062	268 1.068	245 1.060	148 1.079	263 1.079	196 1.067
Monona	107 1.058	94 1.069	312 1.070	311 1.061	212 1.074	238 1.077	212 1.068
Wyll22	150 1.065	119 1.069	298 1.069	230 1.061	149 1.075	258 1.078	200 1.070
Cobbler	87 1.068	141 1.072	226 1.079	245 1.069	152 1.072	223 1.084	179 1.074
Location Means	157 1.067	128 1.071	331 1.075	305 1.065	188 1.076	266 1.080	229 1.072

CHIP AND FRENCH FRY QUALITY OF POTATOES

1969 Ontario Regional Trials

Methods used for selecting, handling tubers were the same as in previous years. Storage temperature has been changed to 45° F. In one test processing was direct from 45° F. storage, and second test 3 weeks' conditioning at 70° before processing. Scoring of french fries was out of 100 points.

- Internal Texture: 50 = very mealy, dry
 40
 30
 20
 10
 0 = very soggy, mushy
- External Appearance: 40 = no wrinkling, flabbiness, unevenness or dulling
 30
 20
 10
 0 = very wrinkled, concave, flabby, uneven or dull
- Internal Color: 10 = white
 0 = grey, creamy, transparent or dull

Chips were scored on the national system out of 100, using a set of 10 photos received from Fredericton Research Station. A rating of over 60 is commercially acceptable.

Scores for both chips and french fries were generally lower than in other years. As shown in the tables, Monona, Kennebec, and Peconic were the only acceptable chippers. Kennebec, F5647, Peconic and Sebago were rated highest for french frying. Conditioned tubers of Wauseon also made acceptable french fries. As expected, the 3 weeks conditioning period greatly improved chip scores. French fry scores were improved by the 3 weeks' conditioning only in the case of the low scoring varieties.

Tubers from Smithfield and Preston location are in storage for processing at later dates.

Ontario table 4. Ontario regional potato trials - 1969. Chip quality rating.

Variety	Following 45°F Storage of Tubers							Following 45°F Storage, Conditioned 3 Wk at 70°F								
	F.W.	Sm.	Br.	Si.	Ott.	Pr.	Ha.	Ave.	F.W.	Sm.	Pr.	Ott.	Si.	Br.	Ha.	Ave.
Monona	85	70	70	60	50	60	40	62.1	1	80	80	80	70	70	50	72.9
Kennebec	70	50	70	50	50	50	50	55.7	2	80	70	75	70	70	70	72.1
Peconic	70	80	50	50	50	40	35	53.6	3	70	80	50	60	70	60	65.7
Sebago	40	80	40	50	30	30	30	42.9	4	70	65	60	60	30	40	50.7
F5647	70	30	60	30	30	40	10	38.6	5	70	30	65	50	60	30	47.1
Wauseon	50	50	20	30	30	10	10	28.6	6	60	50	55	50	20	50	45.0
ND6127-10R	50	25	10	30	50	10	10	26.4	7	70	50	60	70	40	30	55.7
WY1122	40	30	10	30	10	10	20	21.4	8	70	70	40	60	40	30	52.9
B5236-21	50	20	30	30	10	10	10	21.4	8	60	55	30	30	40	20	40.7
Irish Cobbler	10	10	20	20	20	30	20	18.6	9	60	50	60	60	40	50	52.9
B5267-2	20	10	30	10	10	10	10	14.2	10	50	50	70	30	40	30	45.7
Chieftain	10	10	20	10	10	10	10	11.4	11	30	30	30	20	20	10	24.3
Average	47.1	38.8	35.8	33.3	28.3	25.8	21.3			64.2	56.7	56.3	48.3	46.7	39.2	

Ha - Harrow; Si - Simcoe; Pr - Preston; Br - Bradford; Sm - Smithfield; Ott - Ottawa; FW - Fort William

Ontario table 5. Ontario regional potato trials - 1969. French fry quality rating.

Variety	Following 45°F Storage of Tubers								Following 45°F Storage, Conditioned 3 Wk. at 70°F							
	F.W.	Br.	Sm.	Si.	Pr.	Ott.	Ha.	Ave.	Sm.	Br.	F.W.	Ott.	Si.	Ha.	Pr.	Ave.
Kennebec	80	80	80	80	80	70	70	77.1	1	80	80	70	80	80	70	77.1
F5647	90	80	80	70	80	50	80	75.7	2	65	70	80	70	70	70	70.7
Peconic	80	80	80	70	70	70	70	74.3	3	80	75	70	80	20	40	62.1
Sebago	80	70	80	70	50	40	70	65.7	4	70	70	60	60	70	60	65.7
Monona	70	70	70	70	70	50	30	61.4	5	55	70	60	40	50	30	53.6
ND6127-10R	60	40	70	60	40	70	40	54.3	6	60	50	60	40	50	30	50.0
Irish Cobbler	40	60	70	60	50	50	40	52.9	7	65	70	40	60	50	70	59.3
Wauseon	50	70	50	40	50	70	30	51.4	8	75	80	80	40	65	70	68.6
B5267-2	70	50	40	50	70	40	30	50.0	9	75	70	75	50	30	40	57.1
B5236-21	40	70	40	70	30	70	30	50.0	9	70	50	60	40	40	50	50.0
WY1122	60	40	50	40	50	70	10	45.7	10	75	60	70	45	50	40	55.7
Chieftain	50	50	30	40	60	40	30	42.9	11	50	75	65	50	70	75	62.1
Average	64.2	63.3	61.7	60.0	58.4	57.5	44.2			68.3	68.3	66.7	61.7	54.6	53.8	53.7

Ontario table 6. Commercial chip color tests on the potato varieties in the Ontario Regional variety trial and the Eastern Canada Merit trial at the Preston Horticultural Research Station in 1969 conducted at eight dates by the Hostess Food Products, Ltd., Preston, Ontario.

(Tubers stored following harvest at temperature range 52-57° F.)

Varieties	S.G. (1.0)	Chip Color Ratings							
		Nov.6	Nov.19	Dec.4	Dec.19	Dec.30	Jan.14	Jan.27	Feb.13

REGIONAL

Cobbler	78	70*	70	75	60	70	75	60	55
Kennebec	85	75	70	70	75	80	80	80	80
Sebago	79	65	65	75	70	70	65	60	65
Monona	73	85	80	85	85	85	85	80	80
Wauseon	80	85	70	80	75	80	80	80	80
Chieftain	74	60	50	45	55	55	60	50	60
Peconic	90	75	75	80	80	75	75	80	75
F5647	79	83	75	70	75	70	80	70	70
Wyll22	73	65	55	55	50	65	55	50	60
B5236-21	75	65	60	45	60	60	50	60	70
B5267-2	70	80	75	60	70	75	80	70	75
ND6127-10R	74	75	75	70	70	65	55	55	55

MERIT

Kennebec	84	75	75	70	80	75	75	85	80
Monona	72	80	80	85	90	85	85	85	80
Wauseon	78	70	70	80	80	80	75	80	80
Chieftain	74	45	45	55	55	60	55	60	60
G597-20	83	70	70	75	75	75	75	65	70
F6119	93	78	78	85	75	75	80	80	75
F6117	68	70	70	60	60	60	60	60	65
F5748	78	70	70	70	75	75	75	80	70
F5927	83	60	60	65	50	60	55	65	50
F6151	79	40	40	55	50	60	40	45	40
F5810	89	72	72	60	60	75	70	75	75
F5975	86	75	75	55	60	75	80	75	70

*Rating of: 85 or over is Excellent; 75-84 is Good; 65-74 is Fair; 60-64 is Borderline.

DISCUSSION OF POTATO CULTIVARS THAT WERE IN ADVANCED
TRIAL IN ONTARIO IN 1969 AND WHICH MAY
MERIT FURTHER TRIAL OR TEMPORARY
LICENSING IN 1970

Wauseon was given a temporary license in Canada in 1969. Renewal of its temporary license for 1970 should be requested of the Plant Products Division, Production and Marketing Branch, Canada Department of Agriculture. If its performance continues to be favorable, then a permanent license should be requested in 1971. The characteristics and performance of Wauseon in Ontario were thoroughly discussed on page 117 of the 1968 progress report and will not be repeated. Wauseon should be continued in the Ontario Zonal Trials.

Monona 3rd year regionally. A U.S.D.A. introduction. Moderately vigorous vines which mature from early to mid-season. Tubers size early and are white-skinned, blocky, somewhat Cobblerish. Susceptible to most skin diseases such as scab, silver scurf and rhizoc. pustules (black sclerotia). Reported resistant to Verticillium wilt. Yield is comparable to Irish Cobbler. Specific gravity is generally only fair. Fair to good boiler; only a fair baker. Poor french frier generally. Conditioned from 45° or direct from 52° F. storage makes desirable, light-colored chips in the majority of tests. Monona is probably the best chipping prospect in advanced stages of testing in Ontario. Does this merit a request for temporary licensing? (Note: Monona was recommended by the Ontario Committee for temporary licensing)

Peconic 2nd year regionally. Introduced from New York State. Vines are moderately vigorous and mature medium-late. Tubers are sized well by early September and are white-skinned, roundish, fairly smooth and uniform, clean and shallow-eyed. Peconic yields with Sebago generally. Peconic requires good soil moisture and fertility conditions to achieve its yield potential. Abnormally dry conditions result in undersizing of its good set of tubers. Peconic had the best average specific gravity readings in the trial as well as the best overall boiling and baking scores. Its french fry and chipping results compared favorably with those of Kennebec. Peconic is resistant to common scab, mild mosaic and to golden nematode. It certainly merits a third year regionally and Zonal Trial. Notice should be given of request for possible licensing in 1971.

Chieftain 2nd year regionally. From a cross made in Iowa (Dr. A. E. Kehr) but introduced from Wisconsin. Vines are vigorous and in most locations mature medium-late. Tubers are usually sized by late summer. Tubers are round, smooth, attractive, red-skinned, uniform and shallow-eyed. The red skin color persists in storage. The set is higher than Kennebec and undersizing can be a problem where soil moisture becomes limiting. Chieftain yields with Wauseon and Sebago but not usually as high as Kennebec but its tubers are a more desirable size for tablestock pack. The specific gravity is a little lower than Sebago. In the culinary category it is a passable boiler although lacking in mealiness. Chieftain is tolerant to silver scurf and rhizoc. sclerotia, susceptible to Verticillium wilt, resistant to common scab, mild mosaic, the

common races of late blight, stem-end browning and the net necrosis that results from current-season leaf roll virus infection. The leaves are susceptible to irregularly-shaped, small necrotic spots which become quite prevalent in late July-early August. Air pollutants are suspected to be the cause--ozone? Several of the cooperating stations--Simcoe, Bradford, Smithfield, Ottawa, Fort William--mentioned the good performance of Chieftain. Should a temporary license be requested for 1970? (Note: The Ontario Committee recommended Chieftain for a temporary license)

F5647 1st year regionally. A Fredericton selection. Moderately vigorous vines which mature medium-early. Tubers size medium-early and are somewhat Cobblerish, blocky, white-skinned, clean with medium-deep eyes at seed end. Yields with Cobbler. Tubers are more attractive and uniform than those of Cobbler, especially on organic soil at Bradford. Good specific gravity readings generally. Boils and bakes quite mealy with good color ratings. Generally acceptable chip color ratings from over 52° F. storage or occasionally when conditioned following 45° F. French fry ratings are generally satisfactory but the tuber shape is not desirable for this utilization. Resistant to common scab. Merits retrial at all of the cooperating stations in 1970.

Recommended for discard from the Ontario Regional Variety Trial are: ND6127-10R, Wyll22, B5267-2, and B5236-21.

Recommended for inclusion in the 1970 Ontario Regional Variety Trial at all seven stations are:

- | | |
|-----------------------------|--------------|
| 1. Kennebec (standard) | 7. Gbr631-1 |
| 2. Irish Cobbler (standard) | 8. 4407-1 |
| 3. F6119 | 9. F6367 |
| 4. Peconic | 10. B5416-6 |
| 5. F5647 | 11. B5282-13 |
| 6. F6151 | 12. B5236-8 |

COLORADO

James A. Twomey

Seedling Program: Approximately 40,000 first-year seedlings were grown in 1969. These were supplied by Dr. R. V. Akeley, Beltsville, Maryland; Dr. William Hoyman, Prosser, Washington, and the Frito-Lay Company.

Seedlings were planted the first week in May and harvested the first week in September. A total of 477 seedlings were selected for subsequent testing. From the 367 seedlings selected in 1968, forty-eight were selected for further testing. Thirty-nine advanced seedlings were increased and tested for chip quality. These results may be found in Colorado table 1.

Few of the advanced seedlings or named varieties approached Lenape in the chipping trial. Norchip, 6CX6, Oromonte, A6371-2, Kennebec, Pennchip and most Frito-Lay selections performed satisfactorily. All of the seedlings prefaced by WC did not perform well in the chipping test, however, they produced smooth, long russeted tubers and merit further testing for uses other than chips.

Yield Trial: Sixteen varieties were tested in the 1969 yield trial. Selections were planted in two 34-inch rows, 30 feet long and replicated 6 times. Spacing in the row was 10 inches. Planting date was May 14 and harvest was September 15.

Fertilizer (16-20-0) was applied approximately 3 inches below the seed piece at planting, at the rate of 338 lbs. per acre. All plots were furrow irrigated. Yield, grade and percent U.S. No. 1 are reported in Colorado table 2.

BT5215-2 produced the largest total yield and the highest percent No. 1 tubers. It has been marginal in chipping tests but may have value in other forms of processing. Tubers are smooth, uniform with shallow to medium eye depth. Vines are large and late maturing.

Pennchip has performed well in both chipping and yield trials. Lenape has not yielded as expected and tuber size has been disappointing but chipping results have been excellent. Norchip did not recover from frost damage in June and did not perform as well as expected.

DT6063-1R, a smooth, shallow eyed, red selection continues to produce a high percent of marketable tubers. DT6063-1R appears to be a good all purpose potato and has aroused considerable interest among local growers.

WC230-14, a long russet, has an exceptionally good skin and shallow eyes. The yield and size were smaller than expected in the yield trial, however, the size and yield were excellent in the increase block. These differences were attributed to the wider in the row spacing of the increase block. When grown in Washington State, WC230-14 was susceptible to scab. Vine type is similar to Russet Burbank but smaller. It is also later maturing.

Colorado table 1. Chip color^{1/} and specific gravity^{2/} of advanced seedlings.

Clone	Specific Gravity	Harvest Color	3Wk's 70° Color	10Wk's 40°		10Wk's 50°	
				1Wk 70° Color	3Wk's 70° Color	1Wk 70° Color	3Wk's 70° Color
BC6785-1	1.086	46.0	40.0	13.5	11.5	27.0	35.0
WC283-8	1.079	30.0	20.5	10.0	11.5	12.0	16.0
WC284-7	1.089	35.0	27.0	14.0	15.0	19.0	21.5
WC284-20	1.076	31.0	16.5	13.5	14.5	15.0	18.5
WC284-22	1.079	34.0	19.0	9.5	17.5	12.0	11.5
WC285-9	1.085	34.0	23.0	14.5	15.5	15.5	20.5
WC285-15	1.093	35.0	20.5	10.0	16.0	15.5	17.5
WC285-18	1.092	36.5	17.5	15.0	14.0	16.0	20.0
WC285-83	1.089	37.0	28.0	13.0	25.0	24.5	28.5
WC285-85	1.089	39.0	28.0	25.0	22.0	24.0	27.0
WC285-87	1.080	35.0	20.0	10.5	13.5	12.5	14.5
WC285-91	1.079	30.0	16.5	9.0	10.5	11.5	15.0
WC285-110	1.095	38.0	29.0	14.5	20.5	28.0	21.5
WC285-141	1.088	40.0	24.5	19.0	21.0	21.5	29.0
WC285-146	1.083	30.0	15.0	6.5	8.0	11.5	11.0
WC285-150	1.093	43.0	25.0	20.5	14.0	24.0	28.0
G540-14	1.085	31.0	30.5	15.0	22.0	23.0	28.0
BRC6463-4	1.075	35.0	20.0	12.5	11.0	12.0	15.5
BRC6627-2	1.082	38.0	17.0	13.0	20.0	20.0	25.0
BC6530-2	1.079	32.0	26.0	18.5	16.0	21.0	20.0
G575-4	1.084	35.5	31.0	19.0	28.5	27.5	34.0
DT6063-1R	1.085	35.0	14.5	17.0	23.0	15.0	24.5
BT5215-2	1.086	38.5	35.0	21.5	22.0	25.0	28.0
BT5404-2	1.085	38.0	35.0	17.5	25.5	28.5	33.0
6CX6	1.084	44.0	38.0	27.5	25.0	34.5	38.0
A503-42	1.089	36.5	16.5	13.0	31.0	22.0	24.5
Oromonte 172	1.083	35.0	32.5	20.0	29.0	29.0	37.0
Oromonte 265	1.080	39.5	33.5	19.0	29.0	26.0	32.0
Oromonte 278	1.088	33.0	34.0	23.0	31.5	31.0	39.0
Oromonte 293	1.081	32.0	39.0	28.0	31.5	37.0	38.0
Oromonte 440	1.088	37.5	35.0	27.5	32.5	28.5	23.0
Oromonte 441	1.089	40.5	38.5	29.5	36.5	38.5	34.0
Oromonte 442	1.087	41.5	43.0	27.5	37.5	40.0	37.5
Oromonte 443	1.082	37.5	33.5	26.5	32.5	30.0	30.0
A62180-2	1.071	41.5	29.0	16.0	24.5	32.0	30.0
A6371-2	1.091	24.0	30.0	32.0	32.5	34.0	32.0
Lenape	1.100	41.5	40.0	38.5	36.5	43.5	42.0
R. Rural	1.085	41.0	31.0	18.5	18.0	30.0	30.5
Norchip	1.081	41.0	33.0	26.0	28.0	38.0	37.0
Pennchip	1.077	34.0	35.0	28.5	28.0	38.5	25.0
Kennebec	1.085	38.0	41.0	22.0	33.0	32.0	29.5
Frito-Lay 13	1.094	43.0	31.0	35.0	34.0	34.0	35.5
Frito-Lay 162	1.099	45.0	30.0	20.0	30.5	36.5	34.0

Continued

Colorado table 1 Cont.

Frito-Lay 311	1.090	38.0	43.0	36.0	40.0	42.5	38.8
Frito-Lay 315	1.086	33.0	28.0	27.0	28.5	27.0	29.0
Frito-Lay 327	1.073	41.0	38.0	25.0	32.5	36.0	31.0
Frito-Lay 499	1.091	42.0	35.5	29.5	36.0	33.0	32.5
Frito-Lay 526	1.078	37.0	44.0	21.0	27.0	34.0	35.0
Frito-Lay 535	1.079	38.0	29.0	19.5	28.5	26.0	25.0
Frito-Lay 602	1.090	24.0	38.0	28.0	34.0	28.5	39.0
Frito-Lay 616	1.073	27.0	14.0	9.0	14.0	16.0	16.0
Frito-Lay 630	1.085	31.0	32.5	26.0	29.0	28.0	24.0
Wauseon	1.080	32.0	32.0	14.0	23.0	36.5	23.0

- 1/ Chip color determined with Photovolt reflectance meter. Color reading of 25 or above acceptable.
- 2/ Specific gravity determined by potato hydrometer.

Colorado table 2. Total yield and grade for variety trial.

Variety	Yield Per Acre						U.S. No. 1
	U.S. No. 1	U.S. No. 2	Culls	B Size	Total	Total	
	2"-3" > 3"			< 2"		U.S. No. 1	
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Pct.
BT5215-2	295.4	55.2	0.9	2.2	62.8	416.5	84.1
Pennchip	266.3	69.0	3.3	3.0	64.5	406.1	82.5
Russet Rural	277.5	17.9	0.7	0.6	104.4	401.0	73.4
Oromonte	247.6	24.4	8.9	1.6	118.1	400.6	67.6
Red McClure*	244.9	30.6	24.5	6.0	84.6	390.7	70.5
A466-2	246.5	49.9	24.6	4.5	56.1	381.6	77.7
BR6627-2	245.7	13.9	34.9	1.0	83.4	378.9	68.7
Wauseon	231.9	24.3	3.4	1.6	95.6	356.7	71.7
DT6063-1R*	225.4	35.1	8.4	0.5	55.5	325.7	79.4
Kennebec	198.4	40.9	20.2	0.6	62.6	322.6	74.1
BT5043-2R*	211.0	14.4	6.6	2.8	74.6	309.3	72.9
Norchip	184.1	0.9	21.5	2.3	88.6	296.8	62.3
R. Burbank	147.3	27.1	23.5	5.1	88.5	291.5	58.9
Lenape	190.5	16.4	13.7	0.0	64.9	285.5	72.3
WC230-14	172.2	21.6	3.7	0.3	74.9	272.7	71.1
BT5404-2	155.5	2.6	13.6	0.9	86.2	258.7	60.9
Q Test (.05)	49.6	15.0	12.8	N.S.	22.7	59.4	8.1

* Red Selections

CONNECTICUT
Arthur Hawkins

Varieties. Potato variety tests were conducted in 1969 on two commercial farms in the Connecticut River Valley. The location at Farm K had been in shade tobacco for several years prior to 1969. The location at Farm L had been in potatoes for many years previously, with rye cover each winter; the soil had been fumigated for nematode control in spring of 1967.

Seed was supplied by the USDA National Potato Breeding Program, from Presque Isle, Maine, except Raritan from Sangerville, Maine.

Experimental procedures, total yields, yields over 1 7/8", yields over 1 7/8" with seriously off-shaped tubers removed, internal defects, specific gravity, and chip color are given in Connecticut tables 1 and 2. Presence of stem-end discoloration and vascular discoloration are given in the footnotes to tables. Soil and seasonal conditions are also given in the footnotes for each location.

Yields. The soil had ample moisture in May but on the dry side during the first two weeks of June; also dry during early July and the latter half of August. Heavy rainfall totalling 10 inches occurred during the latter half of July through mid-August. Irrigation was applied as needed at location K, and during the latter part of August at location L.

At Farm K, Connecticut table 1, the highest marketable yields were produced by Kennebec, Houma, Oromonte, followed by Lenape. The long-season varieties Lenape and especially Ona may have been disfavored by an application of MH-30 in late August at Farm K and by vinekilling 9/9/69.

At Farm L, Connecticut table 2, B-6139-1; Kennebec, Lenape, Superior and Raritan produced higher yields than other varieties.

Specific Gravity. Specific gravity of the potatoes was generally higher at Location K, where growing conditions favored greater maturity before vinekilling. At both locations Lenape tubers had the highest specific gravity. At Location K, Raritan had the next highest specific gravity. The specific gravity of Peconic was equal to or higher than Kennebec at both locations; both were considerably higher than Katahdin.

Chipping. Following farm storage below 50° until mid-November at Farm K, then storage at 50°, and a period of reconditioning, light colored chips were produced from the following varieties: Lenape, B-6140-3, Peconic, and Kennebec.

From Farm L, following farm storage, later stored at 50°, followed by re-conditioning, the lightest colored chips were produced by B-6140-3, Peconic, and Lenape.

Tuber Observations. Hollow-heart was observed in Raritan and only at Location K.

Significance of Tests. Peconic in variety tests in Connecticut at two locations each in 1968 and 1969, consistently produced tubers of higher dry matter than Katahdin. Peconic reconditioned to produce chips of satisfactory color equal to or better than Kennebec in 1968 and 1969. Yields have been as good as Katahdin or better, under adequate moisture conditions. Spacing farther apart than Katahdin is indicated.

Seedling B6140-3 produced the lightest colored chips in 1969. However, dry matter and yielding ability were not favorable in 1969.

Seedlings Tested. Eighteen seedlings were compared in 12-hill plots at 10-inch spacing at location K; Katahdin was included for comparison in duplicate, Connecticut table 3. Some of these produced good yields with high dry matter, and good chipping color in spite of cold storage early in the season.

Connecticut table 1. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings at Farm K, East Windsor, Connecticut, 1969^{2/}

Variety ^{3/} seedling (Spacing 9" except *)	Total Yield per acre	<u>Yield per acre over 1 7/8"</u>				Free of serious offshape ^{4/}	Specific Gravity ^{5/}	Chip Color ^{6/}	
	Cwt.	Pct.	Cwt.	Pct.	Cwt.			1/15/70	1/23/70
Bake King	402	92	371	92	370	1.071	8.8	8.9	
Houma*(12")	545	93	504	92	502	71	8.9	9.4	
Katahdin	362	95	345	95	344	56	9.1	8.0	
Kennebec*(8")	572	98	559	97	554	68	6.8	6.6	
Lenape*(10")	443	95	419	94	415	84	5.8	5.6	
Ona*(12")	392	91	357	90	355	65	9.0	7.3	
Oromonte	501	90	451	90	450	70	7.2	7.4	
Peconic	436	91	397	91	397	68	7.4	5.7	
Raritan	432	95	411	93	400	81	8.2	8.1	
Superior	341	91	311	91	309	59	8.3	7.8	
Wauseon	320	90	289	90	288	54	9.5	9.0	
B6140-3	296	95	282	93	276	61	6.4	5.8	
L.S.D.	.05				95				
	.01				124				

1/ Plots: 1 row 21 feet; rows 35" apart. Replication: 4 in randomized blocks (each 4 sections x 4 rows) not damaged by sprayer wheels. Soil: Windsor loamy fine sand; shade tobacco previous years; pH 5.7; P = MH; K = H; Mg = MH. Fertilizer: 2350# 8-10-10 sidebands at planting.

2/ Season and conditions: E. Windsor, 12 miles NNE of Hartford. Planted 5/5/69. Ample rain early; irrigated mid-July; then ample rain. MH-30 at 1 gal/A applied Aug. 25. Pct. green 9/5/69: Lenape and Oromonte 100%; others 50 to 60% green, except Katahdin and Wauseon 40%; Peconic 30%. Vine-killed 9/9/69.

3/ Seed: from USDA Presque Isle, Maine; Raritan, from Sangerville, Maine. Seed cut 1 1/2-2 oz; spaced 9" except *.

Connecticut table 1 continued (Footnotes)

- 4/ Tuber Observations: On 3 reps, 10 tubers 2 1/2-3" per rep. Hollow-heart: Raritan 17%; others none.
Stem-end Discoloration. Slight (less than 1/8"): Superior and Peconic, one in 30 tubers (1/30); Oromonte 3/30; Houma 4/30; Katahdin 5/30; Bake King 7/30; Ona and B6140-3, 6/30 plus 3/30 medium (1/8-1/4"), Moderate (1/4-1/2"); Lenape and Raritan 3/30; Kennebec 4/30; Wauseon 7/30.
Vascular Discoloration. Very slight: Houma, Peconic, Superior, 0/30; Katahdin and Lenape 1/30; Bake King, Ona, Oromonte 2/30; B6140-3 and Wauseon 3/30; Slight: Kennebec 4/30; Raritan, 4/30 v. slight and 1/30 mod.
Shape: Bake King, round, deep eyes, russety; Houma, rd. irreg.; Katahdin, oval, irreg.; Kennebec, obl., irreg., large; Lenape, oval, russety; Ona, rd., med., f.g.; Oromonte very good, obl rd., med., yel. skin; Peconic, med. small, oval irreg.; Raritan, obl. pear shape, russety; Superior, irreg. obl., rus. skin; Wauseon, irreg. rd., gr. crks; B6140-3, irreg. obl.
5/ Specific Gravity: by weight in air and in water; average of 4 replicates (approx. 8 lb tubers 2 1/2-3" diam. per sample). 1.080=20.2% dry matter; 1.070=18.1; 1.060=16%.
6/ Harvested: 9/25/69. Storage: farm storage, 40° until graded 11/20/69, then stored at 50°. Specific gravity run 12/15/69. Storage temp. raised to 70° on 12/29/69; chipped 1/15/70 and 1/23/70. Chip color: average of 20 tubers, 10 from each of 2 blocks 1/15; 10 from one block 1/23. Chips with readings 6.0 and 7.0 light; 8.0 acceptable; higher reading, darker chip. Sprouts: on 1/15/70: Superior 1 1/4", Lenape 1", Wauseon 3/4", Ona, Raritan, B6140-3 1/2"; others 1/4".

Connecticut table 2. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings at Farm L, Somers Connecticut, 1969^{2/}

Variety or seedling (Spacing 9" except *)	Total Yield per acre	<u>Yield per acre over 1 7/8"</u>				Specific Gravity ^{2/}	Chip ^{6/} Color
		Free of offshape ^{4/}					
	Cwt.	Pct.	Cwt.	Pct.	Cwt.		
Alamo	341	89	302	87	296	1.053	9.9
Bake King	314	91	287	88	277	69	7.4
Houma* (12")	342	93	318	93	316	68	9.3
Katahdin	295	95	281	95	280	53	8.7
Kennebec* (8")	393	94	368	89	351	62	7.9
Lenape* (10")	369	93	344	93	341	78	6.5
Ona* (12")	271	85	230	83	225	63	9.6
Oromonte	268	89	240	89	240	68	7.3
Peconic	302	88	267	88	266	68	6.0
B5415-6	354	95	337	93	330	61	8.7
Superior	357	96	342	95	339	61	7.8
Wauseon	333	94	312	89	297	64	7.9

continued

Connecticut table 2 continued.

B-5598-2	371	94	347	91	337	52	7.6
B-5946-9	320	95	304	93	297	59	7.5
B-6139-1	399	90	358	90	358	73	8.1
B-6140-3	276	93	257	86	236	59	6.0
L.S.D.	.05					N.S.	

- 1/ Plots: 1 row 21 feet; rows 35" apart. Replication: 4 in randomized blocks (each 4 sections x 4 rows) not damaged by sprayer wheels. Soil: Birchwood sandy loam, cropped by potatoes several years, rye each fall, pH 5.5; Ca = M-; Mg = L; P = H; K = MH.
Fertilizer: 2000# 8-10-10 sidebands at planting; plus 50N sidedressing.
- 2/ Season and conditions: Somers, 25 miles ENE of Hartford. Planted 5/15/69. Ample rain early, very high rainfall mid-July to Aug. 9, 1969. Irrigation latter part August. Vinekilled 9/19/69.
- 3/ Seed: from USDA Presque Isle, Maine. Seed cut 1 1/2-2 oz., spaced 9" except *.
- 4/ Tuber observations: On 3 reps, 10 tubers 2 1/2-3" per rep. Hollow-heart: B6139-1, 1 in 30 tubers, others none.
- 5/ Specific Gravity: by weight in air and in water; average of 4 replicates (approx. 8 lb tubers 2 1/2-3" diam. per sample). 1.080=20.2% dry matter; 1.070=18.1; 1.060=16%.
- 6/ Harvested: 10/15/69. Storage: farm storage, probably down to 40° when graded 11/18/69; then stored at 50°. Specific gravity run 12/17/69. Storage temp. raised to 70° on 12/29/69.
Chipped: 1/21/70. Chip color: average of 30 tubers, 10 from each of 3 blocks. Chips with readings of 6.0 and 7.0 light; 8 acceptable; higher reading darker chip.

Connecticut table 3. Potato seedling test (12 hills), Farm K^{1/}, Conn., 1969

Seedling ^{2/} Spacing 10"	Yield		Specific Gravity ^{3/}	Chip Color ^{4/}	Remarks
	Over 1 7/8"	Off-shape out			
	Cwt/A	Pct			
BR-6246-2	475	82	1.059	10.0	Rd; smooth skin; shal. eye
BR-6265-8	254	90	52	8.0	Rd; rus.skin;shal. eye; sm.
BR-6290-3	305	84	68	7.4	Rd; rus; med. eye; small
BR-6293-12	291	83	77	7.0	Rd; sl.rus; med.
BR-6303-22	342	88	54	9.4	Sl.irreg; shal. eye; small
BR-6312-2	561	87	51	10.0	Irreg.lg; sl.rus; shal.
BR-6315-4	412	90	52	10.0	Rd; sl.rus; shal.
BR-6316-4	282	92	70	5.4	Obl; sl.rus; shal.
BR-6316-5	438	96	72	5.6	Obl; sl.rus; shal; good.
BR-6316-7	387	91	75	7.8	Rd; sl.rus; shal.
BR-6320-1	321	91	63	7.4	Rd; sl.rus; shal.
B-6330-3	650	96	57	10.0	Irreg.lg; yel. skin
B-6343-8	559	93	70	6.4	Rd; smooth; shal.
B-6359-1	340	94	66	6.4	Obl.lg; rus; shal.
B-6376-6	454	98	60	9.2	Rd; smooth; med.
Katahdin	358	94	59	7.6	Rd; sl.irreg; sm. med.
Katahdin	447	96	57	8.4	Rd; irreg; sm. med.
B-5598-2	354	84	53	7.8	Rd; sl.rus; med; red.
B-5946-9	459	95	68	7.4	Rd.irreg; sl.rus; shal.
B-6139-1	538	90	80	7.8	Rd; shal; small.

^{1/} Twelve hills at 10" spacing. See footnote 1, Table 1 for soil conditions, and season. Planted: 5/7/69. Vinekilled 9/9/69.
1 replicate except 2 of Katahdin as indicated.

^{2/} Seed from USDA Presque Isle, Maine.

^{3/} See footnote 5, Connecticut Table 1.

^{4/} Farm storage down to 40° when graded 11/20/69, then stored at 50° until specific gravity 12/16/70; temp. raised to 70°; chipped 1/23/70. Average of 5 chips from 5 tubers.

DELAWARE
Eugene P. Brasher

Seventeen seedlings and six named varieties were tested in 1969. The experimental conditions and procedures were as follows: Soil, Norfolk sandy loam; planting date, 4/3/69; plot design, randomized block; replications, 4; plot size, 3 by 24 feet; spacing in row, 8 inches; fertility, 200 lbs. each N, P₂O₅ and K₂O in bands at planting time; irrigation, when soil moisture reached 50% available; fungicide, Maneb; insecticide, Sevin; harvest date, 8/20/69. Yield and specific gravity results are listed in Delaware table 1.

Delaware table 1. Yield and specific gravity tests, Delaware Agricultural Substation, Georgetown, Delaware, 1969.

Variety or Seedling	Yield of U.S. No. 1 Tubers per acre		Specific ^{1/} Gravity
	Cwt.	Pct.	
Lenape	402	94	65
B6138-3	386	89	62
BR5965-3	383	93	52
Superior	374	94	50
BR5946-9	370	95	53
Alamo	367	91	46
B5132-3	359	92	46
Haig	327	90	48
B5402-2	327	93	49
BR5970-4	310	91	45
B6024-3	296	88	40
BR5948-1	283	92	55
BF5967-7	277	96	53
Katahdin	254	78	45
B5299-39	244	94	48
B6139-11	244	80	62
B5591-1	240	80	58
B6039-1	222	80	53
B5458-6	216	92	47
Wauseon	216	88	48
B6040-14	192	92	54
B5398-4	160	65	50
B6038-1	74	60	49
LSD 5%	43	-	03
1%	57	-	04

^{1/} 1.0 omitted

ICELAND (Reyhjavik, Eyrarbakki)
E. I. Siggeirsson

Thirteen seedlings and five varieties were grown in nematode infected soil at Eyrarbakki, Southern Iceland, for comparison with the commonly grown variety Gullanga.

Sixteen seedlings and 6 varieties were grown in clean soil in Reyhjavik.

The growing season temperatures (July-September) were below normal and unusual heavy rain fell during same period, setting a record for the last 20 years. A killing frost and heavy snow occurred the first part of October. The yields were far below average.

The seedlings and varieties were planted in 6-row plots (3 x 12 feet) with an 18-inch seed spacing.

The following fertilizer was applied per acre: ammonium nitrate, 112 pounds; superphosphate, 80 pounds; K₂O, 82 pounds; and sulfur, 10 pounds. The sulfur was used to decrease common scab.

Yields are given in Iceland table 1. The seedlings differ in their resistance to the golden nematode. B4494-15 and B1558-1 are promising for future growing in Iceland as is ND4122-2. They are early maturing and have good flavor and cooking quality as potatoes are cooked in Iceland. The varieties Lenape, Wauseon, and Alamo yielded well in clear soil, but they have not been grown in nematode infected soil. They have good flavor and cooking quality and will be increased in the future. B4552-2 matured late, but showed high foliage resistance to frost under Icelandic conditions. It is now being used in frost resistance crosses.

All of the test entries were grown on a sandy soil heavily infested with the golden nematode, and on a muck soil free of nematodes.

Iceland table 1. Potato variety and seedlings tested in Iceland, 1969.

Variety or Seedling	Yield Per Acre		Resistance to Golden Nematode		
	Nematode Infested Soil (Sandy Loam)	Clear Soil (Muck)	Type		
	Total	Total	A	B	A x B
	Cwt.	Cwt.			
ND4122-2	53	74	Good	Good	Med.
B4557-2	41	60	Ex.	Ex.	Med.
B4537-8	43	58	Poor	Med.	Good
B4296-9	48	59	Good	Med.	Poor
B4494-15	47	50	Good	Med.	Poor
B1558-1	41	49	Poor	Med.	Med.
B4824-1	39	45	Good	Good	Med.
B4824-7	38	48	Good	Good	Med.
B4839-2	41	53	Poor	Poor	Poor
B4159-2	16	20	Poor	Poor	Poor
B4151-2	14	18	Poor	Poor	Poor

continued

Iceland table 1 continued.

B4151-2	14	18	Poor	Poor	Poor
Gullanga	16	68	Poor	Poor	Poor
Antinema	40	43	Ex.	Poor	Good
Antinema					
x					
B4557-2	41	48	Ex.	Ex.	Ex.
B5281-1		50			
B5288-5		48			
B5132-3		52			
Lenape		58			
Wauseon		60			
Alamo		62			
Nooderling	48	51	Ex.	Good	Ex.

INDIANA
C. M. Jones

Approximately 3000 first-year clones were grown at three locations (Vincennes, Lafayette, Walkerton) to allow for determination of efforts due to location, genotype, and location x genotype interactions. About 800 of these clones were harvested by hand so that tuber number, total weight, dry matter, and protein content could be studied. These analyses are not yet complete, but it is obvious that there is a great deal of genotype x location interaction complicated by the small size reproductive piece of the first-year seedlings. Survival was low at Vincennes, better at Lafayette, and best at Walkerton. An organic soil together with relatively late planting seemed best for the first-year evaluation.

We are continuing our protein investigations into both true protein and free amino acids. These occur in about equal quantities in the potato tuber. We have found that the amino acid composition of the true protein varies relatively little while the free amino acid pool shows a wide variation as shown in Indiana table 1. In fifteen clones, we found lysine to vary by about 5 fold while methionine had a 3 fold variation. Thus, it might be that geneticists and plant breeders should turn their attention to the free amino acid pool in selection for nutritional qualities because of the much higher potential variation present in that portion. Relatively little is known about the variability of the free amino acids with respect to environmental conditions or to cultural variables such as level or type of nitrogen fertilization. These studies are in progress.

Cytogenetic studies of S. chacoense continued with identification of trisomic plants for the second and twelfth chromosomes. The latter was trisomic for an isochromosome (secondary) involving the two long arms of chromosome-12.

Indiana table 1. Amino acid analyses of 15 clones of S. tuberosum.

<u>Amino Acid</u>	<u>Percentage of Total Solids</u>		<u>Maximum/Minimum</u>
Ala	.03 -	.15	5.8
Aba	.00 -	.01	-
Val	.09 -	.37	4.1
Gly	.01 -	.05	3.6
Ileu	.04 -	.18	4.9
Leu	.03 -	.11	3.6
Pro	.01 -	.08	7.6
Thr	.07 -	.20	3.0
Ser	.05 -	.16	3.1
Gam	.18 -	.47	2.5
X	.21 -	.52	2.5
Met	.03 -	.10	3.1
Phe	.07 -	.24	3.2
Asp	.93 -	2.35	2.5
Glu	.59 -	1.02	1.7
Tyr	.05 -	.40	7.5
Orn	.00 -	.02	-
Lys	.06 -	.30	5.2
Try	.00 -	.07	-
Arg	.07 -	.35	4.9
Cys	.00 -	.01	-
Total	2.77 -	6.54	2.4

MAINE

Hugh J. Murphy, David R. Wilson, Michael J. Goven

Cooperative variety trials were conducted during 1969 at Presque Isle, Washburn, and Corinna, Maine. Weather conditions at planting time was cold with cold soil conditions due to rain and delayed melting of snow cover. June, although cool, was ideal for rapid emergence followed by ample moisture and good growing conditions in July and August.

Thirty-four varieties were tested at Presque Isle, twenty-seven at Washburn, and twenty-three at Corinna. Plots were single rows 25 feet in length, and replicated six times. Planting, killing, and harvest dates, seedpiece spacing, and fertilizer used at each location are presented in Maine table 5.

Yields and specific gravities for the varieties grown at all Maine locations are presented in Maine table 1. B5415-6, B6097-9, B5408-2, and Chieftain were the top five in yielding ability. The five highest varieties in terms of specific gravity were F5459, ()BR5960-5, ()BR5960-13, B6139-11, and F6111.

Size determinations by size classes are presented in Maine table 2. Early varieties and a few of the medium early maturing varieties had quite high percentages below 2-1/4 inches in diameter. In some cases the smaller sizes are inherent, but probably was accentuated by a short period of limited rainfall in early August. Oblong varieties in general had growth cracks to varying degrees in 1969, but type was fair to good.

Results of the first chipping and french fry tests of the varieties in 1969 trials are presented in Maine tables 3 and 4. In contrast to 1968, relatively few of the many varieties chipped satisfactorily. B6139-11, B5665-7, Norchip, and all of the RD numbered seedlings made chips of favorable color (7.0 or lower). Twenty-one of the thirty-four varieties tested for french fries made satisfactory color ratings (3.0 or better), but 3 of these varieties, B5665-7, B6024-3, and RD80, were unsatisfactory in french fry texture.

For more detailed information regarding the 1969 Cooperative Variety Trials, consult the annual Maine, New Hampshire, Vermont potato variety trial report; a Maine Agricultural Experiment Station publication.

Maine table 1. Yield and specific gravity of potato varieties grown at three locations in Maine, 1969

Variety	Presque Isle		Washburn		Corinna	
	Yield cwt./A.	Specific gravity	Yield cwt./A.	Specific gravity	Yield cwt./A.	Specific gravity
Bake King	308	1.081	316	1.079	254	1.085
Chieftain	399	1.067	434	1.068	397	1.066
Cobbler	350	1.073	346	1.074	287	1.078
Katahdin	375	1.075	398	1.080	367	1.071
Kennebec	363	1.075	412	1.079	370	1.074
Norchip	329	1.076	358	1.074	289	1.080
Russet Burbank	311	1.078	371	1.083	319	1.082
Sable	322	1.061	357	1.064	254	1.064
Superior	388	1.077	420	1.078	309	1.076
B5267-2	399	1.074	432	1.076	333	1.073
B5408-2	404	1.066	404	1.068	379	1.066
B5415-6	450	1.075	458	1.081	367	1.076
B5613-1	341	1.078	370	1.079	307	1.074
B5665-7	378	1.080	426	1.082	287	1.080
B6024-3	405	1.069				
B6038-1					284	1.071
B6039-1	333	1.069				
B6044-14	381	1.083	407	1.088		
B6097-9	429	1.080	439	1.084		
B6116-18	356	1.064				
B6139-11	422	1.082	424	1.088		
() BR5960-5	394	1.087				
() BR5960-13	360	1.087				
() BR5967-7			390	1.086		
F5459		1.087	388	1.097	247	1.084
F5570	320	1.074	391	1.079	360	1.075
F5647	314	1.072				
F5810	336	1.082				
F59103	350	1.065	362	1.068	285	1.065
F5933	281	1.074				
F6111	402	1.084				
F6124	252	1.079	235	1.079		
RD45	317	1.078	433	1.082	296	1.074
RD80	333	1.068	392	1.071	304	1.068
RD83	373	1.080	432	1.082	300	1.076
RD243	292	1.078	327	1.082	265	1.074
RD311	314	1.083	371	1.088	281	1.082
L.S.D. (0.05)	43	0.002	33	0.002	44	0.003
(0.01)	56	0.003	43	0.003	58	0.004

Maine table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at three locations

Maine, 1969

Variety	Presque Isle		Washburn		Corinna	
	Class	Class	Class	Class	Class	Class
	1-7/8 to 4 inches	2-1/4 to 4 inches	1-7/8 to 4 inches	2-1/4 to 4 inches	1-7/8 to 4 inches	2-1/4 to 4 inches
Bake King	97.5	72.6	96.3	68.7	96.0	65.9
Chieftain	95.1	68.7	96.6	75.7	97.0	84.2
Cobbler	96.1	72.4	96.9	74.3	93.3	63.5
Katahdin	97.8	85.3	97.9	85.1	97.3	87.0
Kennebec	97.4	82.3	97.1	81.1	95.7	83.2
Norchip	94.0	55.5	93.4	42.1	91.7	56.3
Russet Burbank	56.4% 4 to 10 oz.	10 oz.	60.4% 4 to 10 oz.	10 oz.	62.0% 4 to 10 oz.	10 oz.
Sablé	98.9	86.1	98.0	85.5	96.8	75.4
Superior	97.4	84.3	98.2	78.0	97.7	71.1
B5267-2	97.5	80.7	97.8	76.6	98.2	85.8
B5408-2	96.6	77.4	97.1	75.8	98.0	85.7
B5415-6	98.3	87.6	97.7	88.2	98.2	85.4
B5613-1	97.5	78.6	97.4	81.1	85.4	80.2
B5665-7	97.3	80.6	96.3	68.7	96.1	71.4
B6024-3	96.8	73.5				
B6038-1					92.6	64.4
B6039-1	94.7	45.6				
B6044-1495.5	65.4	96.1	69.4			
B6097-9	64.8% 4 to 10 oz.	10 oz.	57.4% 4 to 10 oz.			
B6116-18	94.1	45.4				
B6139-11	95.4	70.8	95.8	68.8		
()BR5960-5	95.9	71.7				
()BR5960-13	97.9	85.8				
()BR5967-7			95.6	83.3		
F5459			98.0	78.1	93.0	81.5
F5570	96.1	84.6	94.6	82.5	96.2	85.9
F5647	96.2	78.6				
F5810	94.8	65.2				
F59103	98.5	85.4	98.7	87.1	96.0	86.5
F5933	96.3	76.4				
F6111	97.8	82.6				
F6124	92.9	58.5	92.9	54.9		
RD45	94.8	63.8	97.4	78.1	95.5	71.9
RD80	96.5	75.0	97.4	81.6	96.3	79.2
RD83	94.7	68.0	96.8	72.2	95.2	69.9
RD243	94.2	61.2	94.9	59.0	96.0	66.1
RD311	97.7	79.9	98.0	81.4	97.8	86.7

Maine table 3. Chip color indices for potato varieties grown at three locations in Maine, 1969^{1/}

Variety	Presque Isle	Washburn	Corinna
Bake King	10.0	10.0	9.4
Chieftain	9.4	10.0	9.1
Cobbler	9.1	9.6	6.7
Katahdin	8.9	7.1	7.5
Kennebec	7.9	7.6	7.6
Norchip	7.2	6.5	5.2
Russet Burbank	8.6	7.7	7.3
Sable	10.0	10.0	9.5
Superior	7.4	7.2	6.3
B5267-2	7.8	7.8	7.0
B5408-2	9.9	9.8	9.5
B5415-6	8.5	7.0	7.4
B5613-1	8.0	8.1	7.4
B5665-7	6.7	5.5	4.7
B6024-3	8.5		
B6038-1			10.0
B6039-1	8.2		
B6044-14	8.8	7.7	
B6097-9	8.1	8.0	
B6116-18	8.7		
B6139-11	7.0	5.1	
()BR5960-5	8.5		
()BR5960-13	6.6		
()BR5967-7		7.4	
F5459	8.9	9.2	9.2
F5570	8.6	9.4	8.6
F5647	8.4		
F5810	9.4		
F59103	8.1	9.4	6.0
F5933	8.3		
F6111	8.8		
F6124	9.3	9.2	
RD45	5.5	6.8	5.5
RD80	5.5	5.7	4.4
RD83	6.6	5.5	4.8
RD243	5.5	4.4	5.3
RD311	5.2	4.0	4.2
L.S.D. (0.05)	0.7	0.8	0.8
(0.01)	0.9	1.1	1.0

^{1/} Chips with lower indices are lighter in color.

Maine table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine. 1969^{1/}

Variety	Color Index ^{1/}	Texture Index ^{1/}
Bake King	5.0	1.2
Chieftain	3.3	1.0
Cobbler	3.1	1.0
Katahdin	3.2	1.0
Kennebec	2.4	1.0
Norchip	1.0	1.0
Russet Burbank	3.0	1.1
Sable	5.0	1.6
Superior	1.9	1.0
B5267-2	1.8	1.0
B5408-2	4.4	1.0
B5415-6	3.0	1.2
B5613-1	2.4	1.2
B5665-7	1.5	1.4
B6024-3	2.5	1.8
B6039-1	2.1	1.0
B6044-14	3.3	1.0
B6097-9	2.8	1.2
B6116-18	2.8	1.1
B6139-11	1.9	1.0
()BR5960-5	2.8	1.0
()BR5960-13	1.2	1.0
F5570	3.2	1.0
F5647	4.1	1.0
F5810	4.1	1.1
F59103	3.0	1.1
F5933	2.8	1.0
F6111	3.8	1.1
F6124	4.0	1.2
RD45	1.0	1.0
RD80	1.0	1.4
RD83	1.0	1.1
RD243	1.0	1.1
RD311	1.0	1.0
L.S.D. (0.05)	0.7	0.2
(0.01)	0.9	0.4

^{1/} French fries with lower index numbers are lighter in color; lower texture indices indicate mealier texture.

Maine table 5. Pertinent information about Maine Cooperative
Potato Variety Trials, 1969

	Presque Isle	Washburn	Corinna
<u>Planted:</u>	May 15	May 15	June 2
<u>Killed:</u>			
Early varieties	Aug. 25	Aug. 23	Sept. 2
Medium varieties	Sept. 2	Sept. 2	Sept. 15
Late varieties	Sept. 12	Sept. 12	Sept. 25
<u>Harvested:</u>			
Early varieties	Sept. 2	Sept. 2	Sept. 15
Medium varieties	Sept. 12	Sept. 12	Sept. 25
Late varieties	Sept. 22	Sept. 22	Oct. 6
<u>Fertilization:</u>			
(pounds per acre)	120-180-180	120-120-120	195-195-195
<u>Seedpiece spacing:</u>			
	1/	1/	1/

1/ Seedpieces of Russet Burbank spaced 16 inches apart; all other varieties at 8 inches.

MAINE

Donald Merriam, F. E. Manzer, and R. V. Akeley

Ring Rot Resistant Seedlings

The results of these annual tests are reported one year behind in order that tubers of selections appearing disease free or questionable in the field can be checked after a storage period of five to six months. As in the 1967 tests, only selections shown in previous plantings to have commercial promise were inoculated in 1968. In these tests all entries were replicated four times in five-hill lots. A total of 36 seedlings from 26 crosses were compared with Teton and Katahdin. Disease readings of Teton and four selections saved for tuber examination are shown in Maine table 6.

Maine table 6. Advanced selections showing resistance to ring rot in five-hill, four-replication inoculation tests, 1968.

Pedigree Number	Amount of disease by replication ^{1/}							
	I Plant Tubers		II Plant Tubers		III Plant Tubers		IV Plant Tubers	
BR6250-1	0/5	0/26	2/5	--	5/5	--	0/5	15/19
BR6260-4	0/5	0/33	0/5	3/40	2/5	--	0/5	4/33
BR6290-3	1/5	3/38	1/5	2/32	1/5	7/32	1/5	5/30
BR6312-2	0/5	0/26	0/5	0/29	2/5?	0/31	0/5	3/31
Teton	1/5?	1/26	1/5	7/34	2/5	--	2/5	10/31

^{1/} Numerator = number diseased

Denominator = number examined

MAINE 1968

Donald Merriam, F. E. Manzer, and R. V. Akeley

Spindle Tuber Resistant Seedlings

Annual progress summaries of this work are delayed one year because of the necessity for replanting inoculated seedlings to obtain disease readings. A total of 36 seedlings from 26 crosses were planted in four, two-hill lots for spindle tuber resistance tests. They were inoculated with PSTV by the top switching method, and a tuber from each hill was harvested for replanting in 1969. Green Mountain and Mohawk, used as controls in this test, both showed complete susceptibility. Only one seedling BR6263-2 showed no symptoms, but seedlings BR6250-1, BR6250-4, BR6319-4, BR6319-20, BR6321-1, showed a high degree of resistance.

MARYLAND

J. G. Kantzes and H. K. Nicholson

Evaluation of Potato Selections--1969

The potato trial was located on the R. E. Ward farm near Stockton on the Eastern Shore of Maryland. Soil type was a light sandy loam. All seed lots were cut and planted in double rows approximately 100 feet long on April 16. Potatoes were harvested on September 12. Observations are summarized in the Maryland table 1.

Maryland table 1. Field evaluation of tubers of potato selections at Stockton, Maryland, 1969.

Selection	Skin	Shape	Size	Secondary Growth	Estimated Yield
Wauseon	Slightly rough	Oblong to round mostly round with some off shape	Small to medium large	Slight	Moderate
Alamo	Smooth	Mostly oblong, few round	Small to medium few large	Moderate	Moderate
B5132-3	Rough	Round	Medium-none large few small	Slight	High
B5141-6	Smooth to slightly rough	Round (flat)	Small to medium to large	Slight	Moderate-high
B5415-16	Smooth to rough	Round with few oblong	Mostly medium	Severe	Moderate-high
B5593 ^{1/}	Very smooth	Slightly oblong	Small to medium	None	Low-moderate
Bake-King	Rough	Round to oblong	Small to medium few large	Moderate	Moderate
Chieftain	Smooth	Round to oblong	Small to medium	Moderate	Moderate
Katahdin ^{2/}	Smooth	Round	Medium to large	Trace	High
Kennebec	Smooth	Severely mis-shapen	Small to large	Severe	Moderate to high
Peconic	Rough	Round	Small to medium	None	Moderate
Pungo	Rough	Round	Small to large	Severe	Moderate

1/ General appearance of these tubers was outstanding.

2/ Considering all factors, the best of the entire group.

MICHIGAN
N. R. Thompson and R. W. Chase

Seed Production

Approximately 50,000 seeds from 24 crosses involving S. tuberosum--
S. stoloniferum hybrids and selected S. tuberosums were produced.

Seedling Populations

Fifty-seven advanced seedling clones were planted in replicated increase plots for yield and quality evaluations. A small collection (46) diploid-haploid hybrids was maintained for further genetic studies at the diploid level. Four hundred and sixty-one selected progenies from a genetic study of dormancy and chipping quality were increased for evaluation as varieties with a potential for the April to July potato chip market. These will be examined at monthly intervals through the storage season.

Overstate Yield and Quality Trial

New varieties and advanced seedling clones from the Michigan State University breeding program were combined in the overstate trials. The favorable growing season resulted in good yields of quality potatoes. Winter tests for storage and cooking quality, chips, french fries, boiling, etc. will complete the evaluation. Only a few of the named varieties appear sufficiently adapted to the Michigan environment to be considered as replacement for the varieties now grown. However, special characteristics such as chip quality and disease resistance, etc. could make others valuable in specific areas. Yield specific gravity and chip data are presented in Michigan table 1.

Several carefully selected advanced clones were vegetatively increased by cuttings and transplanted to the field to assure a uniform increase for varietal consideration.

The response of eight varieties and one seedling clone to six rates of nitrogen was measured to evaluate yield and potato chip quality. Michigan table 2. Chips made from all plots after the September harvest were equally good. Samples have been stored for conditioning and chipping at monthly intervals.

Michigan table 1. Overstate yield trials, Montcalm County, 1969.

Planted May	Yield Per Acre			Specific Gravity	Chip Rating		Harvested October
	Total	US#1	Pct.		60° November 20		
					1 white	10 very dark	
Variety	Cwt.	Cwt.	Pct.				
MS 706-34	481	437	90.8	1.075		7	
Norchief	478	411	86.0	1.076		4	
MS 735-1	466	429	92.1	1.085		5	
Emmet	441	391	88.7	1.078		4	
Lenape	439	397	90.4	1.097		3	
MS 711-8	433	372	85.9	1.072		7	
MS 709	431	422	97.9	1.079		7	
Peconic	429	364	84.8	1.083		2	
Onaway	400	360	90.0	1.069		8	
MS 503	387	347	89.6	1.078		5	
Wyred	385	351	91.2	1.069		7	
Kennebec	383	345	90.1	1.077		6	
Katahdin	377	341	90.4	1.072		4	
Sebago	377	323	85.6	1.073		6	
MS 647-65	375	333	88.8	1.082		3	
MS 706-32	360	320	88.9	1.072		7	
MS 506	358	268	74.8	1.078		6	
Wauseon	350	300	85.7	1.074		3	
MS 706-1	350	277	79.0	1.077		6	
Jewel	347	329	94.8	1.089		2	
MS 711-3	341	287	84.1	1.085		4	
Ia 1111-2	333	298	89.4	1.069		6	
Alamo	331	287	86.7	1.064		7	
Monona	325	271	83.3	1.070		2	
MS 58	316	270	85.4	1.082		4	
Merrimack	308	279	90.6	1.089		5	
Norchip	300	246	82.0	1.077		3	
Haig	300	231	77.0	1.069		4	
Superior	295	260	88.1	1.070		4	
Platte	293	244	83.2	1.066		3	
Minn 148	291	262	90.0	1.066		6	
MS 321-38	289	200	69.2	1.087		4	
Bake King	287	246	85.7	1.083		7	
MS 646-30	285	216	75.8	1.083		4	
Hi Plain	283	248	87.6	1.076		4	

Effect of time of sidedressing on yield, specific gravity and chip quality of several new chipping varieties. (Incomplete Data)

Varieties evaluated:

Haig	Planted: May 2, 1969	Harvested: Sept. 11-12, 1969
Jewel	Fertility: Plow down	120 lbs/A K ₂ O, 50 lbs/A N
Katahdin	Planter	800 lbs/A 12-12-12
Kennebec		
Lenape	Sidedress	

Varieties evaluated, continued:

	<u>Treatments:</u>
Merrimack	1. check - no sidedress
Norchip	2. 40 lbs N June 10
709	3. 80 lbs N "
Superior	4. 80 lbs N June 18
	5. 120 lbs N "
	6. 40 lbs N June 10 + 40 lbs N June 18

Michigan table 2. The yield of several potato varieties in response to different sidedressing treatments. Cwt/A, 1 7/8 minimum size.

	Katahdin	Superior	Haig	Norchip	Kennebec	MSU-709	Jewel	Merrimack	Lenape
1. Check	308	243	189	271	309	403	275	241	265
2. 40 lbs June 10	339	280	241	277	342	345	309	209	332
3. 80 lbs "	345	280	273	265	359	387	325	231	311
4. 80 lbs June 18	329	270	250	277	395	426	353	225	330
5. 120 lbs "	345	280	219	304	368	327	306	216	350
6. 40 lbs June 10 + 40 lbs June 18	345	267	267	280	327	371	325	254	304
Variety Average:	339	270	240	281	350	377	319	229	315
Ave. Spec. Gravity	1.069	1.071	1.064	1.077	1.074	1.073	1.084	1.086	1.093

- Norchip - This variety did not respond to the 40 or 80 lbs N applied either early, late or in split applications, but did produce 33 cwt/A more at the 120 lb N rate than did the check treatment.
- Kennebec - This variety did respond to additions of supplemental N up to 80 lbs. The 120 lb N resulted in the lowest specific gravity at 1.072.
- MSU-709 - This seedling was erratic in its yield response, yet it was the highest yielding variety in this trial. Further studies will be needed to determine its nitrogen requirements. The tubers were very uniform in shape, and had a very low percentage of tubers less than 1 7/8" diameter.
- Jewel - This is a new variety obtained from New York and one which exhibited several desirable features. Throughout the growing season it showed the most vigorous vine growth with a characteristic erect, sturdy and open-type of vine which could be desirable from the standpoint of efficient light utilization and as a desirable factor from a disease standpoint.
- Merrimack - This variety did not respond to supplemental N. This is the latest maturing variety in the trial and at the time of harvest it was still actively growing so perhaps the full effect of any sidedress treatments had not materialized.
- Lenape - This is a variety developed by Penn. State and the USDA and had the highest specific gravity in this trial.

MINNESOTA

Orrin C. Turnquist, F. I. Lauer,
A. Quisembing, and E. B. Radcliffe

Potato variety demonstrations were conducted at eight locations in 1969. In the Red River Valley plots were located at Baker, Crookston and Grand Forks. A plot was also grown on the lighter soils at Fosston. In the irrigated area near the Twin Cities, plots were grown at Osseo, Elk River and Big Lake. In southern Minnesota another plot was located on the organic soil at Hollandale. These trials are conducted in cooperation with commercial growers, county agricultural agents, branch experiment stations and the Minnesota Department of Agriculture. The purpose of the demonstrations is to familiarize the grower with new varieties and to assist him in evaluating the varieties for use in his area.

All seed for the plots was produced the previous year under strict quarantine control at the isolated University of Minnesota potato seed increase farm at Embarrass, Minnesota. The potato increase and testing program is made possible through the financial assistance of the Minnesota Department of Agriculture Seed Potato Division.

All plots consisted of twenty varieties and selections planted in twenty hill rows and replicated twice. Not all of the varieties tested were included at each location. A total of 50 varieties and selections were tested at Baker, Crookston and Elk River for adaptation yield and quality but these data for 30 advanced selections will not be summarized in this report.

At harvesttime the potatoes from the entire plot were weighed and graded for size. Samples were taken for specific gravity and chipping. The performance of the varieties and selections is reported in tables 2, 3, 4, 5, 6, 7, 8, and 9. A summary of the results of three locations in the Red River Valley is presented in table 1. Results of the chipping test after a 6-week storage period at 40° F. and after a 6-week reconditioning period will be reported when the work is completed this winter.

A spacing trial was conducted at the Red River Valley Potato Research Farm at Grand Forks, North Dakota by Mr. Ed Plissey, Area Extension Agent in potatoes. This included the varieties Anoka, Norchip, and Norchief, using a 9", 12" and 15" spacing. Results are presented in table 10.

Minnesota table 1. Potato variety performance for three locations in the Red River Valley, 1969.

Variety	Total Yield	U.S. No. 1	Specific	Dry
	Per Acre	Size	Gravity	Matter
	Cwt.	Pct.		Pct.
Red Pontiac	252	90	1.076	18.9
Kennebec	248	87	1.087	21.2
Norland	241	85	1.077	19.0
Monona	240	87	1.079	19.4
Chieftain	239	83	1.081	19.9
Alamo	238	83	1.081	19.9
Norchief	232	74	1.092	22.3
Irish Cobbler	231	83	1.090	21.7
Norchip	230	85	1.096	23.1
Anoka	224	87	1.084	20.5
Peconic	224	81	1.093	22.4
Superior	215	90	1.090	21.7
Minn. 172 (1)	212	84	1.080	19.6
Grand Falls	210	84	1.097	23.4
Jewell (2)	210	78	1.101	24.2
Minn. 174 (1)	206	85	1.094	22.6
Wauseon	206	80	1.089	21.6
Bintje	200	50	1.087	21.2
Sable	199	90	1.076	18.8
Chinook	194	91	1.087	21.2
Norgold	191	78	1.082	20.0
Lenape	188	82	1.114	26.9
Minn. 140	170	62	1.098	23.5
Average	217	82	1.088	21.4

* Average at Baker, Crookston, Grand Forks.

(1) Crookston and Baker only.

(2) Grand Forks and Baker only.

Minnesota table 2. Potato variety demonstration planting, Baker, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Monona	355	94	1.069	17.3
Chieftain	340	86	1.078	19.2
Norland	322	94	1.076	18.8
Irish Cobbler	318	87	1.088	21.4
Red Pontiac	315	92	1.068	17.1
Kennebec	310	94	1.083	20.3
Anoka	307	92	1.074	18.4
Norchief	306	87	1.090	21.8
Peconic	304	92	1.092	22.2
Norchip	298	90	1.094	22.7
Alamo	279	90	1.080	19.7
Superior	274	97	1.087	21.2
Minn. 172	268	92	1.075	18.6
Wauseon	268	90	1.081	19.9
Grand Falls	256	92	1.089	21.6
Minn. 174	242	92	1.090	22.0
Bintje	237	60	1.087	21.2
Sable	227	92	1.073	18.2
Jewell	219	84	1.099	23.7
Lenape	217	86	1.111	26.3
Norgold	216	82	1.073	18.2
Chinook	208	94	1.090	21.8
Minn. 140	197	53	1.084	20.5
Average	273	87	1.084	20.5

Cooperators: Grower: Frank Thompson & Sons, Baker, Minnesota.
County Agricultural Agent: Ozzie Daellenbach,
Clay County, Moorhead, Minnesota.

Planted: May 13, 1969
Harvested: September 9, 1969
Spacing: 38" Row, 12" Hills
Fertilizer: 300 lbs. 12-36-12 with Planter
150 lbs. (0-0-50 BC Fall 1968
(0-0-60
Insecticide: Disyston with Planter

Minnesota table 3. Potato variety demonstration planting, Crookston, Minnesota, 1969.

Variety	Total Yield	U.S. No. 1	Specific	Dry
	Per Acre	Size	Gravity	Matter
	Cwt.	Pct.		Pct.
Chieftain	187	71	1.083	20.3
Kennebec	185	72	1.091	22.0
Red Pontiac	184	83	1.083	20.3
Peconic	170	62	1.084	20.5
Minn. 174	169	78	1.097	23.3
Norchip	169	73	1.095	22.9
Alamo	167	64	1.079	19.4
Lenape	162	76	1.116	27.4
Norchief	162	52	1.093	22.4
Anoka	160	72	1.089	21.6
Chinook	158	84	1.084	20.5
Minn. 172	157	75	1.084	20.5
Sable	156	84	1.078	19.2
Monona	151	76	1.079	19.4
Superior	149	77	1.093	22.4
Grand Falls	147	65	1.098	23.5
Norgold	142	65	1.084	20.5
Norland	142	64	1.073	18.2
Wauseon	141	57	1.098	23.5
Minn. 140	137	50	1.106	25.2
Bintje	132	28	1.090	21.8
Irish Cobbler	130	69	1.089	21.6
Average	157	68	1.089	21.7

Cooperators: Grower: B. C. Beresford, Northwest Experiment Station,
Crookston, Minnesota

Planted: May 13, 1969
Harvested: September 3, 1969
Spacing: 40" Row, 12" Hills
Fertilizer: 250 lbs. 5-20-20
Insecticide: Thimet with Planter
Herbicide: Eptam, pre-planting soil incorporated

Minnesota table 4. Potato variety demonstration planting, Grand Forks, North Dakota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Alamo	268	96	1.084	20.5
Norland	259	96	1.082	20.1
Red Pontiac	256	96	1.078	19.2
Kennebec	250	94	1.088	21.4
Irish Cobbler	245	93	1.092	22.2
Shoshoni	232	97	1.076	18.8
Bintje	230	63	1.085	20.7
Grand Falls	228	95	1.105	25.0
Norchief	228	83	1.094	22.7
Norchip	224	93	1.099	23.7
Superior	223	95	1.089	21.6
Chinook	218	96	1.087	21.2
Sable	215	94	1.077	19.0
Norgold	215	86	1.088	21.4
Monona	213	91	1.088	21.4
Wauseon	210	94	1.088	21.4
Anoka	206	96	1.088	21.4
Jewell	202	73	1.103	24.6
Peconic	197	88	1.103	24.6
Chieftain	191	92	1.083	20.3
Lenape	184	84	1.114	26.9
Minn. 140	177	82	1.104	24.8
Ona	173	99	1.093	22.4
Hunter	160	94	1.092	22.2
Average	217	90	1.091	22.0

Cooperators: Area Potato Agent: Ed Plissey, East Grand Forks, Minnesota
 Grower: Don Uhlir, Mgr. Red River Valley Potato Research
 Farm, Grand Forks, North Dakota

Planted: May 22, 1969
 Harvested: September 4, 1969
 Spacing: 38" Row, 12" Hills
 Fertilizer: 350 lbs. 8-16-12

Minnesota table 5. Potato variety demonstration planting, Fosston, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Superior	317	96	1.086	21.2
Chieftain	308	94	1.079	19.7
Kennebec	307	97	1.086	21.2
Peconic	304	92	1.097	23.4
Red Pontiac	289	98	1.070	17.8
Norchip	286	95	1.089	22.0
Irish Cobbler	286	90	1.084	20.8
Monona	284	95	1.081	20.0
Grand Falls	274	95	1.090	22.0
Russet Burbank	274	96	1.089	22.0
Norchief	262	81	1.085	21.0
Wauseon	262	94	1.090	22.0
Anoka	260	95	1.082	20.2
Bintje	257	63	1.085	21.1
Norland	241	90	1.074	18.5
Minn. 140	239	84	1.103	24.7
Norgold	233	80	1.086	21.2
Alamo	207	87	1.077	19.3
Jewell	201	77	1.096	23.2
Red Norland	199	96	1.081	20.0
Average	264	90	1.086	21.1

Cooperators: Grower: Oliver Landsverk, Fosston, Minnesota
County Agricultural Agent: Harley Shurson, East Polk
County, McIntosh, Minnesota

Planted: May 23 - 24, 1969
Harvested: October 24, 1969
Spacing: 38" Row, 12" Hills
Fertilizer: 22-82-245 (Sul-po-Mag)

Minnesota table 6. Potato variety demonstration planting, Elk River, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Grand Falls	487	92	1.086	20.9
Red Pontiac	470	94	1.060	15.4
Peconic	429	88	1.079	19.4
Superior	397	92	1.069	17.3
Alamo	395	87	1.065	16.5
Wauseon	393	88	1.076	18.8
Norchief	393	82	1.074	18.4
Kennebec	389	87	1.080	19.7
Chieftain	377	88	1.066	16.7
Norgold	360	87	1.064	16.2
Monona	351	82	1.064	16.2
Norland	348	92	1.061	15.6
Norchip	340	83	1.082	20.1
Anoka	326	89	1.065	16.5
Russet Burbank	312	87	1.077	19.0
Jewell	282	78	1.069	17.3
Early Gem	267	94	1.055	14.3
Cobbler	261	85	1.075	18.6
Minn. 140	236	60	1.082	20.1
Average	359	86	1.071	17.7

Cooperator: Darryl Nelson, Sand Plain Experimental Field, Elk River, Minnesota
 Planted: May 7, 1969
 Harvested: August 28-29, 1969
 Spacing: 36" Rows 12" Hills
 Fertilizer: 1200 lbs. per A. 8-16-16 with planter
 100 lbs. per A. 33-0-0 Side dressed on June 12
 67 lbs. per A. 33-0-0 Side dressed on June 27
 Herbicide: 6 lbs. per A. Eptam preplanting soil incorporation
 Sprayed: Insecticides - Sevin, DDT and Thiodan
 Fungicides - Polyram and Parzate C
 Vines Killed: Rotobeat August 26, 1969
 Irrigations: 16 times at 1" per application

Minnesota table 7. Potato variety demonstration planting, Big Lake, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Grand Falls	647	94	1.072	18.0
Norchip	617	94	1.067	16.9
Wauseon	613	96	1.067	16.9
Red Pontiac	610	96	1.048	12.9
Chieftain	600	93	1.058	15.0
Norland	597	96	1.052	13.7
Superior	568	96	1.067	16.9
Monona	553	92	1.058	15.0
Norchief	551	91	1.064	16.2
Kennebec	514	88	1.065	16.5
Anoka	505	94	1.064	16.2
Peconic	501	95	1.074	18.4
Norgold	473	90	1.068	17.1
Jewell	471	84	1.076	18.8
Chinook	466	95	1.069	17.3
Early Gem	445	96	1.056	14.5
Cobbler	429	89	1.059	15.2
Red Norland	387	92	1.061	15.6
Russet Burbank	380	89	1.067	16.9
Minn 140	355	76	1.074	18.4
Average	514	92	1.064	16.2

Cooperator: Grower: Les Zimmerman & Sons, Big Lake, Minnesota
County Agricultural Agent: Enock Bjuge, Sherburne County,
Elk River, Minnesota

Planted: May 14, 1969
Harvested: October 9, 1969
Spacing: 36" Rows 12" Hills
Fertilizer: 1800 lbs. per A. 9-23-30 with planter
(Ammono. Nit) Side dressing 300 lbs. per A. 33.5-0-0 plus
Side dressing 300 lbs. per A. 9-23-30
Insecticide: 15 lbs. per A. Thimet 15G

Minnesota table 8. Potato variety demonstration planting, Osseo, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Wauseon	430	92	1.080	19.7
Red Pontiac	413	94	1.068	17.1
Superior	405	94	1.077	19.0
Grand Falls	402	96	1.074	18.4
Norland	395	96	1.061	15.6
Chieftain	390	94	1.069	17.3
Norgold	376	92	1.072	18.0
Norchief	366	82	1.070	17.5
Kennebec	363	94	1.079	19.4
Norchip	353	92	1.079	19.4
Alamo	352	92	1.067	16.9
Peconic	349	90	1.083	20.3
Cobbler	346	92	1.074	18.4
Monona	338	92	1.063	16.0
Anoka	316	88	1.070	17.5
Bintje	299	83	1.075	18.6
Chinook	289	94	1.074	18.4
Minn 140	273	60	1.088	21.4
Early Gem	272	95	1.066	16.7
Russet Burbank	184	86	1.070	17.5
Average	346	90	1.073	18.2

Cooperator: Grower: Nobbe Bros., Osseo, Minnesota, Route 2
County Agricultural Agent: George Roadfeldt, Hennepin
County, Minneapolis, Minnesota

Planted: May 1, 1969
Harvested: September 30, 1969
Spacing: 34" Rows 12" Hills
Fertilizer: 1100 lbs. per A. 8-16-16 Spec. with planter
(Ammon. Nit) 300 lbs. per A. Sidedressed
Insecticide: 25 lbs. per A. Thimet 10G
Fungicide: 7 times at 6-day intervals with Manzate D
Irrigated: 11 times at 1-1/4" every 5-1/2 to 6 days

Minnesota table 9. Potato variety demonstration planting, Hollandale, Minnesota, 1969.

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Peconic	614	93	1.075	18.6
Norchief	485	90	1.066	16.7
Chieftain	475	94	1.063	16.0
Grand Falls	469	96	1.071	17.7
Cherokee	464	94	1.067	16.9
Norgold	460	92	1.069	17.3
Wauseon	454	92	1.063	16.0
Monona	443	97	1.063	16.0
Kennebec	436	93	1.058	15.0
Alamo	400	94	1.064	16.2
Red Pontiac	393	91	1.055	14.3
Anoka	386	89	1.066	16.7
Bintje	376	83	1.065	16.5
Norchip	359	80	1.065	16.5
Irish Cobbler	331	89	1.068	17.1
Chinook	316	94	1.072	18.2
Superior	310	88	1.077	19.0
Red Norland	277	92	1.067	16.9
Norland	257	80	1.058	15.0
Minn. 140	146	74	1.072	18.0
Average	393	90	1.066	16.7

Cooperators: Grower: Herb Brand, Hollandale, Minnesota
County Agricultural Agent: Eldon Senske, Freeborn County,
Albert Lea, Minnesota

Planted: May 8, 1969
Harvested: October 7, 1969
Spacing: 34" Row, 12" Hills
Fertilizer: 425 lbs. 0-14-42 broadcast
275 lbs. 7-28-14 side-dressed

POTATO SPACING TRIAL - Potato Research Farm, Grand Forks, N.D.
Ed Plissey and Orrin C. Turnquist
Area Potato Agent and Extension Horticulturist
University of Minnesota

Variety	Spacing	Below 2"	Above 2"	Total Yield Per Acre
		Pct.	Pct.	Cwt.
Anoka	9"	9	91	189
	12"	6	94	180
	15"	8	92	208
Norchip	9"	9	91	223
	12"	10	90	236
	15"	9	91	209
Norchief	9"	25	75	195
	12"	24	76	150
	15"	22	78	152

Planted: May 22, 1969

Harvested: September 29, 1969

Fertilizer: 400 lbs. 8-16-12

A SUMMARY OF 5-YEARS RESEARCH
ON APHID RESISTANCE IN THE WILD, TUBER-BEARING SOLANUM SPECIES
E. B. Radcliffe and F. I. Lauer

In 1965, we initiated a survey of wild tuber-bearing Solanum species for possible sources of resistance to green peach aphid, Myzus persicae (Sulzer) and potato aphid Macrosiphium euphorbiae (Thomas). A total of 905 introductions representing 83 Solanum species or species hybrids have been evaluated.

Materials to be evaluated are started in the greenhouse, then transplanted to the field at Grand Rapids, Minnesota. We rely on natural infestations but augment these by routine application of the insecticide carbaryl to eliminate natural enemies. The sampling procedure used is to examine each plant for a given interval (we have standardized on 40 seconds) and to count the number of apterous aphids that can be located in that time. We attempt to have plots with each entry represented by 5-6 plants in each of 4 replicates. The average sample, including those entries with 1 or more replicates of missing data, has been 13 plants per entry.

The data presented here (table 1) represents an attempt to summarize the results we have obtained in the first 5 years (1965-9) of this study, and to characterize the relative aphid resistance of various Solanum species. Because there were many variables in the circumstances of these tests it was necessary to develop an arbitrary system of comparison. This was done as follows: In each evaluation made the various introductions were ranked on the mean number of aphids per plant. For reasons unrelated to this summary it was most convenient for us to use data which we had transformed to the base $\log_{10}(x + .01)$. Entries ranked in the first decile, i.e., the most resistant, were rated 0, and the others accordingly on a 1-9 scale. Species means (table 1) were obtained by averaging the ratings for all introductions of that species in each of the trials conducted. Accordingly, entries that were retested contributed more than observation to the mean of that species. Introductions showing evidence of resistance were usually retested while those that proved susceptible were discarded. By selecting resistant entries for retesting we should have biased the mean resistance rating for that species, but because of the greater proportion of resistant entries in the subsequent trials the mean decile rank of the species of intermediate resistance may not be as low. Actually those species represented by an appreciable number of entries appeared to have remarkably consistent mean ratings from trial to trial. The means calculated for species represented only a few times in the trials (perhaps less than 5) probably represent an insufficient sampling to permit an accurate assessment of their potential value as sources of aphid resistance. Some species are highly variable. E.g. some S. stoloniferum introductions were consistently resistant to green peach aphid while other introductions of that species showed little evidence of resistance.

On the basis of this data (table 1), of the entries represented by 10 or more observations, the species with greatest resistance to green peach aphid were: stenophyllidium (0.2), michoacanum (0.9), brachistotrichum (1.0), bulbocastanum (1.4), sanctae-rosae (1.6), chomatophilum (1.9), cardiophyllum (2.2), canasense

(2.8), hjertingii (2.9), multidissectum (3.0) and oxycarpum (3.0), and resistant to potato aphid: hougasii (1.9), hjertingii (2.1), bulbocastanum (2.4), multidissectum (2.4), oxycarpum (2.5), polytrichon (3.1), raphanifolium (3.1), canasense (3.2), stoloniferum (3.3), chomatophilum (3.6), and verrucosum (3.6). By comparison the corresponding values for the S. tuberosum check clones were 7.8 (g.p.a.) and 6.8 (p.a.). The S. tuberosum andigena introductions averaged 5.4 (g.p.a.) and 3.8 (p.a.). These data suggest that cultivation and efforts of plant breeders have not improved the aphid resistance of potato.

We have found the greatest evidence of aphid resistance in certain species of the potato series Pinnatissecta. The series Longipedicellata appears a prime source of resistance to the potato aphid. S. bulbocastanum, series Bulbocastana more than any other species appears resistant to both aphids. Resistance to the two aphid species is significantly correlated but there species which appear resistant to only one of the aphids e.g. michoacanum is resistant to green peach aphid but not to potato aphid.

The range of differences in green peach aphid resistance have been greater than those observed for potato aphid. However, the potato aphid was abundant only in 1967, and in that instance certain S. stoloniferum introductions were clearly the most resistant of any of the materials tested. As a result of this survey sources of appreciable resistance to both green peach aphid and potato aphid have been identified. The question now is whether this resistance can be incorporated into S. tuberosum parental stock thereby permitting the development of aphid-resistant cultivars.

Summary of 5 years of evaluation of Solanum introductions for resistance to green peach aphid and to potato aphid.

<u>Solanum</u> Species	Resistance rating ^{1/}	
	green peach aphid	potato aphid
<u>acaule</u>	7.0(61)	4.6(72)
<u>acrosopicum</u>	6.7(3)	4.3(3)
<u>agrimonifolium</u>	7.3(8)	5.6(10)
<u>ajanhuiri</u>	5.6(8)	5.6(8)
<u>andreaeanum</u>	2.8(5)	2.3(7)
<u>berthaultii</u>	6.6(13)	7.2(12)
<u>boliviense</u>	3.3(12)	4.3(12)
<u>brachistotrichum</u>	1.0(12)	4.3(12)
<u>brachycarpum</u>	6.8(9)	4.0(11)
<u>brevicaule</u>	4.0(6)	5.7(6)
<u>brevidens</u>	2.7(3)	6.6(5)
<u>bukasovii</u>	3.7(3)	3.7(3)
<u>bulbocastanum</u>	1.4(73)	2.4(91)
<u>cajamarcesense</u>	4.5(2)	5.0(2)
<u>canasense</u>	2.8(38)	3.2(41)
<u>capsicibaccatum</u>	0.0(1)	0.0(1)
<u>cardiophyllum</u>	2.2(56)	4.4(54)
<u>chacoense</u>	6.8(40)	6.4(45)
<u>chacoense</u> x <u>multidissectum</u>	-	2.5(2)
<u>chauca</u>	7.0(1)	8.0(2)

continued

species	green peach aphid	potato aphid
<u>chiquidenum</u>	5.3(8)	5.1(8)
<u>chomatophilum</u>	1.9(15)	3.6(17)
<u>clarum</u>	5.3(3)	3.0(4)
<u>coelestipetalum</u>	-	8.0(1)
<u>colombianum</u>	4.5(6)	4.4(5)
<u>commersonii</u>	3.4(8)	2.4(9)
<u>curtilobum</u>	5.6(10)	4.4(11)
<u>demissum</u>	6.6(66)	4.0(84)
<u>etuberosum</u>	1.2(6)	3.8(5)
<u>fendleri</u>	4.1(32)	5.8(32)
<u>fernandezianum</u>	2.0(1)	2.0(2)
<u>gandarillasii</u>	7.7(3)	2.5(4)
<u>gourlayi</u>	4.6(13)	6.3(16)
<u>guerreroense</u>	7.0(3)	4.4(5)
<u>hjertingii</u>	2.9(22)	2.1(29)
<u>hougasii</u>	3.4(9)	1.9(12)
<u>huancabambense</u>	1.0(1)	7.5(2)
<u>infundibuliforme</u>	2.1(8)	4.0(8)
<u>iopetalum</u>	5.3(3)	2.2(6)
<u>jamesii</u>	3.1(20)	5.9(23)
<u>kurtzianum</u>	7.5(13)	7.5(14)
<u>kurtzianum</u> x <u>multidissectum</u>	-	3.0(1)
<u>laxissimum</u>	7.5(2)	0.5(2)
<u>leptophyes</u>	2.3(3)	5.3(3)
<u>lignicaule</u>	3.5(4)	4.7(3)
<u>maglia</u>	6.0(3)	8.3(3)
<u>marinasense</u>	3.1(14)	3.8(12)
<u>medians</u>	4.3(12)	4.4(14)
<u>megistacrolobum</u>	3.3(35)	4.7(37)
<u>michoacanum</u>	0.9(31)	4.2(37)
<u>michoacanum</u> x <u>multidissectum</u>	5.0(1)	6.0(1)
<u>microdontum</u>	7.6(28)	6.2(29)
<u>mochiense</u>	8.0(1)	8.0(1)
<u>moscopanum</u>	4.0(2)	4.8(4)
<u>multidissectum</u>	3.0(42)	2.4(50)
<u>multinterruptum</u>	1.0(1)	0.0(1)
<u>ochranthum</u>	8.0(1)	0.0(1)
<u>oplocense</u>	5.0(3)	5.7(3)
<u>oxycarpum</u>	3.0(10)	2.5(15)
<u>pampasense</u>	4.3(9)	4.5(10)
<u>paucijugum</u>	5.0(4)	2.0(4)
<u>papita</u>	5.6(11)	5.9(15)
<u>phureja</u>	5.2(68)	5.1(76)
<u>phureja</u> x <u>tuberosum</u>	5.4(11)	3.8(11)
<u>pinnatissectum</u>	5.1(20)	6.7(23)
<u>piurae</u>	9.0(1)	9.0(1)
<u>polyadenium</u>	5.6(13)	6.9(17)
<u>polytrichon</u>	4.6(36)	3.1(50)
<u>raphanifolium</u>	5.6(20)	4.8(28)

continued

species	green peach aphid	potato aphid
<u>sambucinum</u>	7.3(4)	3.6(5)
<u>sanctae-rosae</u>	1.6(28)	3.9(26)
<u>sandemanii</u>	4.0(1)	8.0(1)
<u>sogarandinum</u>	8.0(1)	1.0(1)
<u>soukupii</u>	1.0(2)	5.0(3)
<u>sparsipilum</u>	7.4(19)	6.6(22)
<u>spegazzinii</u>	4.5(19)	6.4(18)
<u>spegazzinii</u> x <u>phureja</u>	-	5.0(1)
<u>stenophyllidium</u>	0.2(18)	3.9(17)
<u>stenotomum</u>	5.2(37)	5.1(44)
<u>stenotomum</u> x <u>tuberosum</u>	6.7(3)	8.3(4)
<u>stoloniferum</u>	3.3(99)	3.3(118)
<u>sucrense</u>	6.3(6)	5.0(10)
<u>tarijense</u>	5.8(12)	8.4(11)
<u>toralapanum</u>	3.2(5)	3.8(4)
<u>tuberosum</u> subsp. <u>andigena</u>	5.4(213)	4.7(265)
<u>tuberosum</u> subsp. <u>tuberosum</u> cks.	7.8(50)	6.8(67)
<u>tuberosum</u> x <u>canasense</u>	0.0(1)	7.0(1)
<u>tuberosum</u> x <u>chacoense</u>	9.0(1)	9.0(1)
<u>tuberosum</u> x <u>megistacrolobum</u>	9.0(1)	6.0(1)
<u>tuberosum</u> x <u>multidissectum</u>	8.0(1)	4.0(1)
<u>tuberosum</u> x <u>phureja</u>	5.0(1)	2.0(2)
<u>tuberosum</u> x <u>stenotomum</u>	2.8(4)	4.3(4)
<u>tuquerrense</u>	1.5(2)	4.0(2)
unidentified (WRF 1156)	1.5(2)	0.0(2)
<u>vallis-mexici</u>	0.0(1)	0.0(1)
<u>venturii</u>	5.6(5)	5.5(4)
<u>vernei</u>	7.6(8)	7.0(10)
<u>verrucosum</u>	3.8(44)	3.6(54)

1/ Resistance rating is the mean of the decile rank of the data transformed to the base $\log_{10}(x + .01)$, 0 = most resistant, 9 = most susceptible. Number in parenthesis indicates the number of observations, i.e. sum of the introductions of that species screened in the various evaluations, some introductions were tested more than once and accordingly contributed more than one observation to the mean rating of that species. A single evaluation was made in each of the years 1965-8, and 2 in 1969.

NEW JERSEY
John C. Campbell

Three potato variety trials were conducted by Rutgers University--The State University of New Jersey in 1969 to evaluate new numbered and named potato varieties for yield, grade, horticulture characteristics, and specific gravity.

Vegetable Research Farm, Rutgers: Seed of 15 named and 42 numbered varieties were hand-planted on April 10 ten inches apart in 36-inch rows with 4 replications. Seed was cut and treated with captan dust and stored 5 to 7 days at 55-60° F. in a damp basement. A 10-20-10 fertilizer was band-placed at 1900 pounds per acre. Rainfall was at or above normal during the growing season; insects and late blight were controlled with a regular spray schedule.

Potatoes were harvested September 23 and 24, after all vines were mature.

Yield, grade, specific gravity, and tuber evaluation data are shown in table 1.

The ten highest yielding varieties were USDA and Fredericton, Canada, seedlings producing yields ranging from 436 to 356 cwt/A of US No. 1 potatoes. The seedling F5459 has been released by Rutgers University and the Canada Department of Agriculture under the name of "Raritan."

Other varieties with relatively high yields were Lenape, Pennchip, Superior, Kennebec, and Norchip.

An observation plot comprised of 55 USDA selections was planted in single 15-hill plots.

Yields above 350 cwt of US No. 1's were produced by B6595-5, B6591-7, B6565-2, BR6448-7, BR6491-7, B6529-12 and B6537-4. These and several others will be requested for further evaluation.

Specific gravity levels, determined by the weight in air weight in water method, were generally low with F5459 (Raritan) having the highest specific gravity of 1.0750, followed by F6434 with 1.0747, Lenape 1.0742, and BR5948-1 at 1.0715. Specific gravity of other varieties was below 1.070.

George Coombs' Farm, Shirley--In Cooperation with Campbell Institute for Agricultural Research: In this study 10 named and 24 numbered varieties were hand-planted on April 16. Seed was spaced 10" apart in 34-inch rows 20 feet long and replicated 4 times. One ton per acre of a 6-12-6 fertilizer was banded by the planter when the rows were opened. Rainfall was excessive during most of the growing season.

Varieties yielding over 300 cwt. of U.S. No. 1's included Kennebec, Norchip, Grand Falls, Superior, F5459 (Raritan), and five USDA seedlings (table 2).

The specific gravity of all varieties was relatively low. The highest specific gravity of 1.0706 was recorded for F5459 (Raritan).

George Rue Farm, Imlaystown: Fourteen named and two numbered varieties were machine planted in 2-row plots, 200 feet long, on April 15. Seed was spaced 9" apart in 36" rows and fertilized with 2200 lbs. per acre of a 6-12-12. Rainfall was adequate and insects and diseases were controlled through recommended pesticide applications as needed.

The potatoes were harvested October 28.

Nine varieties produced yields ranging from 300 cwt. to 441 cwt. per acre of US No. 1 grade potatoes. The specific gravity of all varieties was very low with Lenape and F5459 (Raritan) having the highest specific gravity of 1.0679 and 1.0640 respectively (table 3).

New Jersey table 1. George Rue Farm, Imlaystown, New Jersey.

2200 lbs/A of 6-12-12 + 30 lb N side-dressed Machine planted April 15, 1969
Seed spaced 9" x 36" Harvested October 28, 1969
Varieties planted in 2-row plots, 200 feet. long
Eptam and Thimet applied for weed and insect control.

Variety	Yield Per Acre				Off Grade	Specific Gravity	Remarks
	US#1s						
	Over 2"	Total	Over 2"	"Bs"			
	Cwt.	Cwt.	Pct.	Pct.	Pct.		
Lenape	441	470	94	5	-	1.0679	
Kennebec	431	474	91	6	3	1.0540	1% rot, 2% knobs
Norchip	395	416	95	2	3	1.0583	1% rot, 2% knobs
Jewel	388	426	91	8	·	1.0522	
Peconic	336	347	97	3	·	1.0552	
Superior	325	339	96	4	-	1.0465	
Chippewa	321	353	91	4	5	1.0440	scab and knobs
F5459 (Raritan)	311	345	90	9	1	1.0640	knobs
Bake King	300	330	91	8	-	1.0593	
Pride	294	316	93	6	-	1.0529	
Pennchip	269	299	90	9	1	1.0612	growth cracks
Cobbler	261	293	89	9	2	1.0500	knobs
B5461-4	261	284	92	8	-	1.0440	
Katahdin	260	280	93	7	-	1.0442	
Alamo	216	277	78	14	8	1.0430	growth cracks & knobs
Wauseon	206	224	92	6	1	1.0492	irregular

Note: Data are averages of two plots.

New Jersey table 2. Rutgers University Vegetable Research Farm, New Brunswick, New Jersey.

1900 lbs/A 10-20-10 banded before planting
Seed spaced 10" x 36" - Plots 20' long
Replicated 4 times

Hand planted April 10, 1969
Harvested September 23, 1969

Variety	Yield cwt/A		Percent-		3/ Specific Gravity	4/ Tuber Rating	Shape	Skin	Remarks
	US #1's (over 2")	Total	US #1's over 2"	B's 1 1/2"-2"					
B6138-3	436*	476*	92	8	693	3	Round	Purple	Good appearance
BR5946-9	421	443	95	5	639	3+	Round	Smooth	2% knobby
F5810	399	443	90	8	625	3	Round-oblong	Netted	
B5400-8	385	407	95	5	666	2	Round-oblong	Smooth	
BR5965-3	374	432	87	10	568	3	Round-oblong	Smooth	3% growth cracks and knobby
BR6316-4	370	417	89	3	686	2+	Oblong-long	Smooth	8% knobby
B5415-6	363	410	88	4	600	2+	Oblong-round	Smooth	8% growth cracks and knobby
Raritan F5459 E	363	421	86	10	750	3	Oblong	Netted	4% knobby
BR6312-2	356	454	78	12	472	2+	Round-oblong	Smooth	1% knobby
BR6316-7	356	410	87	6	651	2+	Round-oblong	Smooth	7% growth cracks and knobby
B5141-6 B	348	388	90	10	742	3	Round-oblong	Smooth	
Pennchip B	348	392	89	9	664	3	Round-oblong	Smooth	
BR6246-2	341	436	78	17	657	3	Round-oblong	Smooth	5% knobby
Superior E	338	363	93	4	545	3	Oblong-round	Sli.Net	3% knobby
Kennebec B	334	392	85	7	567	2+	Oblong-long	Smooth	8% knobby
BR5948-1	334	388	86	13	715	3	Round-oblong	Sli.Net	
Norchip ND	327	392	83	14	583	3+	Oblong-round	Sli.Net	3% knobby
B6139-11	327	385	85	13	728	3	Round-oblong	Smooth	2% knobby
BR6315-4	327	359	91	7	509	2+	Round	Smooth	2% growth cracks
B6044-14	319	385	83	4	686	3+	Oblong-long	Russet	13% knobby
B6024-3	319	396	81	13	450	3+	Oblong-long	Russet	6% knobby
BR6306-22	312	428	73	3	600	2	Oblong-round	Smooth	24% growth cracks and knobby
Wauseon B	309	348	89	6	551	2+	Oblong	Smooth	5% knobby
Jewel P	309	356	87	11	589	3	Round-oblong	Smooth	2% knobby
B5132-3	305	367	83	9	498	3	Round-oblong	Netted	8% knobby

Continued

New Jersey table 2 continued.

F6434	305*	378*	81	17	747	3	Oblong-round	Russet	2% knobby
ND6594-16	301	327	92	7	555	4	Oblong-long	Russet	
Chippewa B	298	334	89	10	482	3+	Round-oblong	Smooth	
Grand Falls F	290	378	77	15	648	2+	Oblong	Smooth	7% knobby
Katahdin B	276	309	89	8	555	3	Round-oblong	Smooth	3% knobby
BR5967-7	276	309	89	6	694	3	Round-oblong	Smooth	5% growth cracks
Peconic G	269	334	80	4	611	2+	Round	Smooth	15% scabby
B6265-8	269	323	83	10	515	2+	Oblong	Russet	7% knobby
B6263-2	261	319	82	10	497	3	Oblong	Smooth	8% knobby
B5461-4	258	301	86	8	561	3	Oblong-long	Smooth	6% knobby
ND7103-4	258	294	88	12	594	3	Round	Smooth	
F5748	243	280	87	9	670	3	Oblong	Netted	4% knobby
B5740-2	240	359	67	24	515	2+	Oblong-round	Smooth	9% knobby
ND7240-9	236	272	87	8	570	2+	Oblong	Netted	5% knobby
B5647-8	229	269	85	14	527	3+	Oblong-round	Smooth	1% growth cracks
B5591-1	221	287	77	20	667	3	Oblong	Smooth	3% knobby
Bake King G	221	261	85	14	594	3	Oblong	Smooth	
B5282-13	218	338	64	11	589	1	Long	Smooth	25% knobby
B5665-7	218	287	76	16	582	2+	Round-oblong	Smooth	8% knobby
BR6316-5	218	250	87	7	660	2+	Oblong-long	Russet	6% knobby
F5850	214	247	87	12	536	3	Oblong-round	Smooth	
ND5751-7	214	240	89	11	497	2+	Oblong-round	Smooth	10% knobby
F6124	211	290	73	17	630	2+	Oblong-round	Smooth	
B5647-9	211	247	85	15	578	3	Round-oblong	Smooth	19% knobby
F6491	207	309	67	14	481	1	Oblong-long	Smooth	3% knobby
B6039-1	203	250	81	16	583	3	Oblong-long	Smooth	3% growth cracks
Cobbler B	203	247	82	15	550	3+	Round	Smooth and knobby	
Alamo B	167	272	61	15	465	1	Oblong	Smooth	24% rot and knobby
ND7233-9	163	192	85	15	486	3	Oblong-long	Russet	
F6243	160	189	85	6	661	2+	Oblong-long	Netted	9% knobby
Pride B	156*	211*	74	26	538	3	Round	Smooth	
ND7196-18	116	192	60	34	532	2+	Oblong-round	Smooth	6% rot
LSD - 5%	60.3								
LSD - 1%	67.1								

1/ Source of varieties: B or BR = USDA; F = Young, Canada; E = Eastman, Maine; ND = Johansen, North Dakota; P = Pragg, New York; G = Gangier, N. Y. 3/ 1.0 omitted from specific gravity values; average of 2

replications.

2/ Yields are averages of 4 replications.

4/ 1 = poor to 5 = excellent appearance.

*=to nearest whole number.

New Jersey table 3. George Coombs Farm, Shirley, N. J., in cooperation with Campbell Institute of Agricultural Research.

2000 lbs/A - 6-12-6 Banded at Planting
Seed spaced 10" x 34" - plots 20' long
Replicated 4 times

Hand planted April 16, 1969
Harvested September 30, 1969

1/ Variety	Yield Per Acre			3/ Specific Gravity	4/ Tuber Rating	Shape	Skin
	US#1	Total	Over 2"				
	Cwt.	Cwt.	Pct.				
BR6312-2	493*	585*	84	459	3+	round-oblong	smooth
Kennebec B	400	450	89	548	3+	oblong-long	smooth
Norchip ND	362	412	88	588	3+	oblong-round	netted
BR5946-9	358	397	90	565	3	round-oblong	netted
F5459 (Raritan)	354	416	85	706	3+	oblong	netted
B5132-3	343	393	87	514	3	round-oblong	netted
Grand Falls Y	327	420	78	580	4	oblong-long	smooth
BR6316-7	327	397	83	686	3	round-oblong	smooth
BR5965-5	316	377	84	607	3+	round-oblong	russet
Superior E	300	335	90	562	3+	round-oblong	netted
BR6315-4	296	343	87	467	2+	round-oblong	smooth
Jewel P	296	366	81	584	3	round-oblong	smooth
Chippewa B	293	350	84	466	3	oblong	smooth
BR6316-4	270	320	84	568	3	oblong	smooth
Peconic G	266	296	90	606	3	round-oblong	smooth
Katahdin B	266	304	87	492	3	oblong-round	smooth
B6024-3	262	354	74	428	4	oblong	russet
B5740-2	254	362	70	485	4	oblong	smooth
B6263-2	250	323	77	485	4	round-oblong	netted
ND7103-4	243	308	79	557	3	oblong-round	smooth
ND5751-7	239	273	87	524	3	oblong-round	russet
BR6316-5	235	270	87	542	3	oblong-long	netted
B5665-7	223	304	73	563	4	round-oblong	smooth
B6265-8	216	273	79	489	3	round-oblong	russet
Pennchip B	216	258	84	618	3	round	smooth
F6243	216	250	86	632	3	oblong-long	netted
Bake King G	212	273	77	636	3	oblong-round	netted
B5282-13	212	269	79	559	3+	oblong-long	smooth
ND7233-9	204	243	84	536	2+	oblong-long	russet
B5647-8	189	277	68	506	3+	round-oblong	smooth
F6124	173	258	67	556	4	round-oblong	smooth
ND6594-16	158	219	72	507	4	oblong	russet
Pride P	135	239	57	562	3	round-oblong	smooth
ND7196-18	131	246	53	518	4	oblong	netted
LSD 5%	98			1.0005			
LSD 1%	130			1.0007			

1/ Source of variety: B or BR = USDA; ND = Johansen, North Dakota; G = Gangier Bros., New York; E = Eastman, Maine; P = Pratt, New York.

2/ Yields and specific gravity values are averages of 4 replications.

3/ 1.0 omitted from specific gravity values.

4/ 1 = poor appearance to 5 = excellent.

* = to nearest whole number.

NEW YORK (Long Island)
S. Dallyn, P. Schippers, and D. Fricke

REGULAR POTATO VARIETY TRIAL

METHODS

Planted 4/11/69, 9" spacing
Fertilized with 3000 lbs/A 6-12-6 at planting, plus 40 lbs. N on cover crop the preceding fall.
Plots 1 row by 30 feet, 5 replications
Vines killed 9/11, harvested 9/22, graded and examined 10/9.
Samples were kept in common storage until 10/17 when specific gravity and black spot readings were made.

EARLY POTATO VARIETY TRIAL

Methods

Ten varieties were placed in a trial designed to obtain information on their early yield and ability to stand up during marketing in this immature state.

Planting

All varieties were planted 4/14, sprout 8 (approximately 10").
3000 lbs/A 6-12-6 banded at planting plus 40 lbs. N on cover crop the preceding fall.

Harvest

The following four treatments were involved:

- (1) Vines rotocut and sprayed with sodium arsenite 7/24, harvested 8/7.
- (2) Vines rotocut and sprayed 8/3, harvested 8/13.
- (3) Vines rotocut 8/7 and harvested immediately.
- (4) Vines rotocut 8/13 and harvested immediately.

Design

Split plot. Primary plots (harvest) 3 rows x 300', secondary plots (variety) single row x 30'. Four complete reps of primary plots.

Post Harvest Handling

Two samples from all variety-harvest treatments were taken; one washed, the other not. These were placed in 10-lb. vent-view paper bags and kept in common storage five days. At the end of that time they were checked for number of tubers affected by bacterial rot.

Specific gravity and black spot determinations were also made on all treatments from two replications.

Results

The effects of dates of vine killing and harvest are given in Dallyn tables 3 and 4. In no case was the variety-harvest interaction significant. Dallyn tables 5 and 6 contain the skinning and rot data and Dallyn table 7 the information on specific gravity and black spot.

In general, the main effects were as expected--killing 10-14 days pre-harvest reduced yield and specific gravity but improved skin set and keeping quality. Black spot was somewhat higher at the August 13 harvest than on August 7.

Marked differences occurred between varieties with Haig, Alamo, Superior, Norgold, Peconic and Norchip all showing promise. Superior is known to be quite wilt susceptible, Norgold skinned badly and Norchip had only fair appearance for fresh market. Neither Haig or Norgold had acceptable yield potential for use as midseason varieties. Haig, Peconic, and Superior were fairly susceptible to black spot. Alamo was lower than the rest in specific gravity.

OBSERVATIONAL POTATO VARIETY TRIAL

METHODS

Planted 4/16/69, 9" spacing

Fertilization: 3000 lbs/A 6-12-6 at planting, plus 40 lbs N on cover crop the previous fall

Plots 1 row by 30' - 2 replications

Vines killed 9/11, harvested 9/22, cured one week in common storage then placed at 45° F. until 10/17 when specific gravity and black spot readings were made.

Dallmyn table 1. Regular potato variety trial. Long Island Vegetable Research Farm, Riverhead, New York, 1969.

[illegible]1/ in 30' plot

2/ 1 - none

5 - severe

3/ 1 - poor, 5 - excellent

4/0 - no discoloration, 5 - very severe discoloration over area 10 mm or more diameter

5/ tubers showing cracks in the impact area in b.s. determination.

6/ dates 50% and 80-90% of foliage dead

7/ 1.0 omitted

Dallyn table 2. Regular potato variety trial. Long Island Vegetable Research Farm, Riverhead, New York, 1969.

Potato Varieties and Source

Onaway - Cassidy, Michigan
 Lenape - U.S.D.A., Maine
 Peconic - Gagnier, N. Y.
 F5459 - Maine Seed Board
 B5415-6 - Maine Seed Bd.
 Kennebec - Thible, Maine
 Katahdin - Chandler, Maine
 Norchip - Ryan Farms, N. D.
 Alamo - Christie, Maine
 Superior - Guenther, Wisc.
 Keswick - Can. Foundation
 Chippewa - Etscovitz, Maine
 Ona - Maine
 Bake King - Gagnier, N. Y.
 Cobbler - Baines, Maine
 Russet Burbank - Dalzell, N. D.
 Norgold - Ryan Farms, N. D.
 Haig - Shaver Farms, Nebr.

Comments

Very irregular shape; prominent lenticels, deep eyes. Not recommended for Long Island despite its high yield.
 Sprouted, very short rest period; shallow eyes; good shape, skinned badly.
 Deep apical eye, slightly netted, good shape and uniformity.
 Slight net; shallow eye, slightly elongated with some pear shape, short rest period, hollow heart not a problem in 2-3 1/2".
 Bright skin with slight net; distinctive shallow eye and brow; attractive round shape.
 Elongated, slightly irregular shape; bright skin, shallow eye.
 Bright skin; shallow eye; good shape.
 Bright skin; fairly deep eye; f. irregular shape; short rest period.
 Bright skin, shallow eye, slightly elongated.
 Slight net, shallow eye, uniform shape.
 Bright skin, deep eye, irregular shape.
 Bright skin, flattened; uniform shape.
 Slight net, shallow eye, round uniform shape, nice size.
 Slight net, shallow eye, round uniform shape, nice size.
 Very irregular, rough shape; deep eye.
 Better than average shape and uniformity for this area.
 Short rest period, very good shape and uniformity.
 Netted skin; short rest period, small size.

Dallyn table 3. Effect of vine killing and date of harvest on yield of potatoes (CWT/A).

Variety and Source	Kill 7/24		Kill and Harvest 8/7		Kill 8/3		Kill and Harvest 8/13		Pct. of vines dead 8/13
	Harvested 8/7		8/7		Harvested 8/13		8/13		
	Total	Size A	Total	Size A	Total	Size A	Total	Size A	
Onaway - Michigan	342	307	433	400	440	395	474	424	30
Norchip - N. D.	324	273	367	330	339	293	372	314	40
Superior - Wisconsin	292	255	344	316	335	312	408	382	90
Alamo - Maine	293	238	343	300	339	287	360	310	90
Cobbler - Maine	275	228	343	320	354	319	386	334	80
Peconic - New York	264	219	355	317	338	300	359	318	30
Keswick - New Brunswick	277	255	275	253	315	295	359	340	70
Haig - Nebraska	255	193	287	226	307	237	310	244	80
Katahdin - Maine	186	164	287	263	289	256	333	303	20
Norgold - N. D.	252	196	303	248	271	214	304	259	60

Dallyn table 4. Main effects on yield (Cwt/A)

Harvest		Total	"A"	"B"
Kill 7/24, harvest 8/7		276	233	34
Kill and harvest 8/7		334	297	33
Kill 8/3, harvest 8/13		333	291	33
Kill and harvest 8/13		367	323	31
	LSD 5%	21	23	NS

Variety				
Onaway		422	381	20
Norchip		351	303	31
Superior		345	316	22
Alamo		334	284	42
Cobbler		340	300	31
Peconic		329	289	33
Keswick		307	286	15
Haig		289	225	62
Katahdin		274	247	23
Norgold		282	229	48
	LSD 5%	29	29	5

Dallyn table 5. Effect of vine killing and date of harvest on skinning and keeping quality.

	Kill 7/24 Harvest 8/7			Kill & Harvest 8/7			Kill 8/3 Harvest 8/13			Kill and Harvest 8/13		
	Skin-1% Rot			Skin-% Rot2/			Skin-% Rot			Skin-% Rot		
	ning	Dry	Wet	ning	Dry	Wet	ning	Dry	Wet	ning	Dry	Wet
Onaway	3.9	0	0	4.2	3.1	3.7	3.4	0	3.1	3.4	1.2	6.1
Norchip	2.1	0	0.8	2.5	4.7	6.4	2.0	0	3.5	2.4	0.9	2.8
Superior	1.4	0	0.9	2.3	2.7	1.4	1.6	0	3.0	2.1	0	2.1
Alamo	2.3	0	1.5	2.5	0.8	2.2	1.8	0	4.4	2.4	0	2.0
Cobbler	3.5	0	3.1	4.1	0.9	8.2	3.3	4.8	9.5	3.6	2.6	12.7
Peconic	1.9	0	1.1	3.5	0	6.8	2.4	1.2	0.7	3.3	3.0	2.9
Keswick	4.0	0	4.3	3.4	0	13.2	3.6	2.3	12.9	3.4	3.4	27.1
Haig	1.1	0	0	1.4	0	0	1.0	0.7	0.5	1.6	0.8	0
Katahdin	4.4	0	2.6	4.8	1.0	4.9	4.6	0.8	7.0	4.4	0	4.4
Norgold	3.8	0	0	4.3	0.6	0.8	3.0	0	1.9	3.3	0	4.1

1/ 1 - none, 5 - severe

2/ Pct. number of tubers affected

Dallyn table 6. Main effects on skinning and rot.

<u>Harvest</u>	<u>Skinning</u>	<u>Pct. Rot</u>	
		<u>Dry</u>	<u>Wet</u>
Kill 7/24, harvest 8/7	2.8	0	1.4
Kill and harvest 8/7	3.3	1.4	4.8
Kill 8/3, harvest 8/13	2.7	1.0	4.7
Kill and harvest 8/13	3.0	1.2	6.4
<u>Variety</u>			
Onaway	3.7	1.1	3.2
Norchip	2.3	1.4	3.4
Superior	1.9	0.7	1.9
Alamo	2.3	0.2	2.5
Cobbler	3.6	2.1	8.4
Peconic	2.8	1.1	2.9
Keswick	3.6	1.4	16.9
Haig	1.3	0.4	0.1
Katahdin	4.6	0.5	4.7
Norgold	3.6	0.2	1.7

Dallyn table 7. Specific gravity and black spot susceptibility.

Treatments: a. 2 harvest dates (Aug. 7 and 13)
 b. previously killed vs. not killed)
 c. 10 varieties
 d. 2 replications (III, IV)

) 80 samples

Black Spot

Treatment: 125 g-30cm-10° C (25-50 tubers per sample)

<u>Analysis of variance</u>			<u>Spec.Grav.</u>		<u>Black Spot</u>			
	<u>s.s</u>	<u>d.f.</u>	<u>m.squares</u>	<u>F</u>	<u>s.s.</u>	<u>d.f.</u>	<u>m.squares</u>	<u>F</u>
Reps	2785	1	2785	31.0**	1748	1	1748	1.5
Dates	205	1	205	2.3--	11761	1	11761	10.0**
Killings	4774	1	4774	53.2**	13676	1	13676	11.6**
Varieties	31657	9	3518	39.1**	217245	9	24138	20.5**
RD	2	1	2	1.0	4	1	4	1.0
RK	174	1	174	1.9	11	1	11	1.0
RV	618	9	69	1.0	10656	9	1184	1.0
DK	92	1	92	1.0	61	1	61	1.0
DV	1256	9	140	1.6	12251	9	1361	1.2
KV	1025	9	114	1.3	12158	9	1350	1.2
DKV	1032	9	115	1.3	12726	9	1414	1.2
Error	2515.4	28	89.8		32980.7	28	1177.9	

(Analysis carried out with weights in water of 5000 g of potatoes)

(Analysis carried out with black spot results x 100)

continued

Dallyn table 7 continued.

	Specific Black											
	<u>Gravity</u>	<u>Spot</u>	<u>Pec.</u>	<u>Nor.</u>	<u>Al.</u>	<u>Sup.</u>	<u>On.</u>	<u>Kat.</u>	<u>Cob.</u>	<u>Kes.</u>	<u>Nor.</u>	<u>H.</u>
1. Peconic	1.0669	2.66		+	+	-	+	+	-	+	-	-
2. Norchip	.0677	2.12	-		+	+	+	+	+	+	-	-
3. Alamo	.0541	1.66	+	+		+	-	-	+	+	+	+
4. Superior	.0618	2.64	+	+	+		+	+	-	+	-	-
5. Onaway	.0546	1.69	+	+	-	+		-	+	+	+	+
6. Katahdin	.0591	1.71	+	+	+	-	+		+	+	+	+
7. Cobbler	.0632	3.03	+	+	+	-	+	+		-	+	+
8. Keswick	.0657	3.17	-	-	+	+	+	+	+		+	+
9. Norgold	.0607	2.29	+	+	+	-	+	-	-	+		-
10. Haig	.0599	2.38	+	+	+	-	+	-	-	+	-	

(Averages of 8 samples,
2 reps x 2 dates x
2 killings)

(Signif. (+) and nonsig. (-) differences
in specific gravity between varieties)

	<u>Specific Gravity</u>	<u>Black Spot</u>
Rep III	1.0627	2.38
" IV	1.0600	2.29

Average of 40 samples
(2 dates x 2 killings x 10 varieties)

	<u>Specific Gravity</u>	<u>Black Spot</u>
First Harvest	1.0611	2.21
Second Harvest	1.0617	2.46

Average of 40 samples
(2 reps x 2 killings x 10 varieties)

	<u>Specific Gravity</u>	<u>Black Spot</u>
Previously killed:	1.0597	2.21
Not killed:	1.0631	2.46

Average of 40 samples
(2 reps x 2 dates x 10 varieties)

	<u>Specific Gravity</u>	<u>Black Spot</u>
Previously killed:	1.0597	2.21
Not killed:	1.0631	2.46

Average of 40 samples (2 reps x 2 dates x 10 varieties)

Correlation coefficient between specific gravity and black spot susceptibility
(variety totals): 0.702

Dallyn table 8. Observational potato variety trial. Long Island Vegetable Research Farm, Riverhead, New York, 1969.

	Yield Per Acre				5/ Jumbo		1/ Specific Black		2/ Shatter		3/ Appearance		4/ Maturity	
	2-3 1/2"	Jumbo	"B"	Pickouts	Hollow	Pct.	Gravity	Spot	Pct.					
	Cwt.	Cwt.	Cwt.	Cwt.										
BR6316-7	513	3	54	27	100		73	1.18	48		3.0		9/2	--
NY-30	381	10	46	18	25		52	1.08	36		3.0		8/7 - 9/10	
NY-44	349	0	36	10	--		61	1.80	32		3.5		9/2	--
NY-41	346	213	13	0	0		63	1.96	20		4.0		9/10	--
NY-36	338	33	26	33	0		62	2.52	52		2.0		8/14 9/10	
BR6316-4	335	8	12	49	0		68	1.96	12		4.0		8/14	--
Katahdin	334	44	13	0	0		52	1.68	12		3.8		9/2	--
NY-43	333	38	23	19	9		56	0.52	8		3.5		8/25 9/10	
NY-45	330	78	23	12	10		65	2.12	24		2.5		8/14 9/10	
B4557-2	324	0	59	23	--		68	3.12	4		2.8		9/10	--
NY-42	312	45	15	23	0		57	1.88	44		4.0		9/2	--
B5267-2	307	4	8	74	0		62	2.00	68		3.5		7/24 8/14	
F5459	306	18	38	13	67		79	2.16	4		4.0		9/2	--
Kennebec	305	3	28	23	0		60	1.08	32		3.3		8/25	--
Katahdin	303	36	18	0	0		51	1.78	30		3.8		9/2	--
NY-39	294	9	26	5	0		60	1.96	8		3.0		8/25 9/10	
B4494-6	288	37	17	4	11		55	1.20	36		3.0		7/31 9/2	
NY-38	280	74	28	2	0		67	2.64	0		3.0		9/10	--
BR6316-5	250	8	18	2	100		69	1.72	60		4.0		8/7 9/10	
B5281-1	184	0	23	82	--		47	2.44	42		4.5		--	7/24

1/ 0 - no discoloration

5 - severe over area 10 mm or more dia.

2/ tubers showing cracks in the impact area in black spot determin.

3/ 1 - poor

5 - excellent

4/ dates 50% and 80-90% of foliage dead

5/ 1.0 omitted

Dallym table 9. Observational potato variety trial. Long Island Vegetable Research Farm, Riverhead, New York, 1969.

<u>Potato Varieties and Source</u>		<u>Comments</u>
BR6316-7	U.S.D.A., Maine	Moderate to severe skinning; rough skin; prominent lenticels; elongated.
NY-30	Cornell	Moderate skinning; and fairly rough skin.
NY-44	Cornell	Slight skinning; slightly prominent lenticels, a little shatter bruise.
NY-41	Cornell	Round; very large jumbos, no skinning, slightly prominent lenticels.
NY-36	Cornell	Moderate skinning; rough skin and prominent lenticels; stitched end, some growth crack and shatter bruise.
BR6316-4	U.S.D.A., Maine	Some skinning; oblong shape; some growth crack and shatter bruise.
Katahdin	Cornell	Slight to moderate skinning; bright skin.
NY-43	Cornell	Round, deep apical eye, slight net, some growth cracks.
NY-45	Cornell	Prominent lenticels, deep eyes; moderate skinning.
B4557-2	U.S.D.A., Maine	Severe skinning; deep apical eye.
NY-42	Cornell	Some skinning; bright color; slight amount of shatter bruise.
B5267-2	U.S.D.A., Maine	Knobs; some growth cracks, bright color; attractive uniform size.
F5459	J. Campbell, Maine	Slight net, some pear-shape.
Kennebec	Thible, Maine	Moderate skinning; bright color, oblong.
Katahdin	Chandler, Maine	Moderate skinning; bright color, oblong.
NY-39	Cornell	Round, prominent lenticels, rough skin.
B4494-6	U.S.D.A., Maine	Moderate to severe skinning, deep apical eye.
NY-38	Cornell	Prominent lenticels; rough skin; round.
BR6316-5	U.S.D.A., Maine	Elongated; slight skinning.
B5281-1	U.S.D.A., Maine	Very severe shatter bruise; red color.

NEW YORK (Long Island)
R. C. Cetas

Evaluation of Potato Varieties and Breeding Lines
for Resistance to Verticillium wilt on
Long Island in 1969

A 4-phased field program was conducted to evaluate potato breeding lines and varieties for Verticillium wilt resistance on Long Island. The separate phases of the program were as follows: Phase I - 1 to 4-hill (usually from a single tuber) nonreplicated plots of recently developed breeding lines; Phase II - 5 to 10-hill nonreplicated plots of selections from Phase I of the previous year; Phase III 20-hill nonreplicated plots of selections from Phase II of the previous year, certain selections of Phase III of the previous year, and selections from the USDA potato breeding program; and Phase IV - replicated 20-hill plots of selections from Phases III and IV of the previous year and selected named varieties. In Phases I and II selections were made on the basis of plant symptoms to the disease. In the other 2 phases, yield and other horticultural characteristics were considered also. The primary source of breeding lines for evaluation was the Cornell University potato breeding program. Advanced selections from the USDA potato breeding program, however, were evaluated in Phases III and IV.

Materials and Methods

In 1969, 937 entries were included in Phase I, 45 in Phase II, 57 in Phase III, and 34 in Phase IV. The seed pieces were cut and treated with 7.5% captan dust between March 26 and March 31. The seed pieces were stored at 55 to 60° F. until planted. The breeding lines in Phase I were planted on April 15 and 16, in Phase II on April 15, and in Phases III and IV on April 14. The hills were spaced 12 inches apart in the row and the rows were approximately 34 inches apart. The grower cooperator fertilized and marked the rows with his potato planter and the seed pieces were planted with a hand planter. All other cultural practices were those employed by the grower cooperator. The soil was a light Sassafras silt loam and it was naturally infested with Verticillium dahliae and other organisms associated with Verticillium wilt on Long Island.

Observations on plant growth and vine condition were made periodically during the growing season. On August 11, the breeding lines and varieties in all plots were rated 1 to 7 for vine condition. The rating system used was as follows: 1 - plants normal or nearly so, 2 - slight bronzing and wilting of foliage, 3 - 60 to 90% of the foliage green, 4 - 40 to 60% of the foliage green, 5 - 20 to 40% of the foliage green, 6 - trace to 20% of the foliage green, and 7 - all plants dead. All selections and varieties with a rating of 4 or less were considered to possess resistance to Verticillium wilt.

The breeding lines included in Phases III and IV were harvested on September 5. All tubers harvested from each plot of Phases III and IV were counted, weighed, and sized on a grader equipped with a 2-inch screen. All size A tubers (tubers that passed over the 2-inch grader chain) were examined for knobs and growth cracks. Forty size A tubers, or all size A tubers if less than 40 were available,

from each plot were examined for pinkeye and for stemend vascular browning. The pinkeye was scored as follows: 0 - none, 1 - lesions confined to the eyes, 2 - lesions extended beyond the eyebrows but not coalesced, 3 - lesions coalesced at apical end of the tuber and/or secondary rot initiated, and 4 - lesions from apical eyes coalesced with those lower on the tuber and/or secondary rot progressed into flesh of the tuber. Stemend vascular browning was scored in a cross-sectional plane 1/8 to 1/4 inch above the stem attachment where the vascular bundles more or less begin to parallel the long axis of the tuber. The scoring system used was as follows: 0 - none, 1 - trace of brown, 2 - 1 to 6% of the vascular ring brown, 3 - 6 to 12% of the vascular ring brown, 4 - 12 to 25% of the vascular ring brown, 5 - 25 to 50% of the vascular ring brown, and 6 - 50% or more of the vascular ring brown. The pinkeye score and the stemend browning score for each plot was obtained by dividing the sum of the individual tuber scores by the number of tubers examined. Forty size A tubers of several selections in Phase III and 50 size A tubers of all but 3 entries in Phase IV were examined for hollow heart and internal necrosis. A potato hydrometer was used to determine the specific gravity of an 8-pound sample of tubers from each plot in Phases III and IV.

All data, except percentage of tubers with hollow heart, growth cracks, and internal necrosis, from the replicated plots (Phase IV) were subjected to the analysis of variance. Percentages were converted to equivalent angles and the transformed data were analyzed. Duncan's multiple range test was used to determine significant differences at the 5% level among means.

Results

An excellent stand of plants was obtained with most breeding lines and varieties. The environmental conditions were favorable for the development of Verticillium wilt and the first symptoms were observed about mid-July.

Of the 34 varieties and selections included in the replicated trial (Phase IV), Houma, Ona, B5415-6, NY-39, NY-40, NY-43, NY-45, F8-11, F21-14, F289-11, F325-4, F326-23, and F395-2 appeared to be more resistant to Verticillium wilt than Katahdin based on the wilt scores of August 11. The following selections, however, produced 350 or more cwt of size A tubers per acre: B5415-6, F9-31, F118-1, F289-11, F325-4, and F395-10. In contrast, the average size A yield was 287 cwt/A for Katahdin and 169 cwt/A for Kennebec. Of the 6 selections that produced 350 or more cwt of size A tubers per acre, B5415-6 produced the highest yield, but 18% of the tubers had hollow heart and about 10% had small knobs that developed from the apical eyes. Hollow heart was found in 72% of the F118-1 tubers. Selection F325-4 produced tubers that were free of most defects but the plants matured late. Tubers of Selection F395-10 were relatively low in specific gravity and 61.3% had stemend vascular browning.

Twenty of the 57 varieties and selections included in Phase III had a wilt rating of 4 or less on August 11. Fifteen selections produced 350 or more cwt of size A tubers per acre. Nine of the high yielding selections had a wilt score greater than 4 on August 11. Six of the 45 selections in Phase II and 110 of the 937 selections in Phase I had a wilt score of 4 or less on August 11.

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Cetas table 1. Wilt rating and yield of potatoes grown in soils naturally infested with organisms associated with Verticillium wilt on Long Island, 1969 (4 replicates, 20 hills, 12-inch spacing).

Variety	Stand 5/23 Pct.	Wilt Score 8/11	Yield Per Acre		Ave. No. Tubers/hill	
			Total Cwt.	Size A 1/ Pct.	Total	Size A 1/ Pct.
Chieftain	100 k	6.75 o	374 r	66 j	9.8 q	6.5 r
Chippewa	97 ij	6.25 n	338 no	78	6.5 ij	5.1 kl
Houma	100 k	3.75 fg	400 t	64 fg	9.9 q	6.3 qr
Katahdin	100 k	5.25 jk	304 k	77 p	5.6 d-g	4.3 hi
Katahdin	98 jk	5.50 kl	340 no	75 no	6.0 gh	4.5 ij
Kennebec	100 k	7.00 o	208 c	68 k	4.7 bc	3.2 c
Keswick	100 k	7.00 o	345 op	75 u	4.8 c	3.9 efg
Ona	98 jk	2.75 bc	252 e	62 d	6.0 gh	3.8 efg
B5415-6	97 ij	4.00 gh	482 vw	80 s	8.1 m	6.5 r
B5415-6	98 jk	4.50 i	485 w	80 s	8.3 m	6.6 r
BR6315-4	97 ij	6.75 o	289 i	63 def	6.8 jk	4.3 hi
NY-30	98 jk	6.25 n	298 jk	54 b	8.4 mn	4.6 ij
NY-36	98 jk	6.25 n	280 h	65 hi	6.7 jk	4.3 hi
NY-38	97 ij	6.00 mn	149 a	51 a	3.4 a	2.1 a
NY-39	93 fg	4.00 gh	241 d	65 ghi	5.7 e-h	3.7 de
NY-40	92 ef	4.00 gh	359 q	78 q	5.5 def	4.3 hi
NY-41	86 a	5.00 j	326 m	76 op	6.7 jk	5.1 kl
NY-42	98 jk	5.75 lm	241 d	65 ij	5.7 fgh	3.7 ef
NY-43	97 ij	4.25 hi	353 pq	63 ef	7.6 l	4.8 jk
NY-44	98 jk	7.00 o	268 fg	67 k	5.5 def	3.7 ef
NY-45	96 hi	4.00 gh	336 n	73 m	6.5 ij	4.8 jk
F 5-3	93 fg	6.75 o	150 a	62 de	4.3 b	2.6 b
F 8-11	92 ef	3.50 ef	341 no	63 def	9.1 op	5.8 op
F 8-23	86 ab	5.75 lm	181 b	62 d	5.3 de	3.4 cd
F 9-31	97 ij	5.75 lm	426 u	81 t	8.1 m	6.6 r
F10-14	98 jk	5.50 kl	246 de	64 f-h	6.8 jk	4.3 hi
F21-14	95 gh	4.00 gh	355 f	78 qr	6.7 jk	5.2 lm
F23-23	91 de	5.00 j	294 ij	79 rs	5.2 d	4.1 gh
F30-8	98 jk	6.25 n	334 n	65 ij	8.8 no	5.7 nop
F118-1	98 jk	5.75 lm	400 t	73 m	7.3 l	5.4 mn
F289-11	96 hi	3.25 de	476 v	76 p	7.3 l	5.6 mno
F293-10	90 cd	6.75 o	273 gh	86 v	4.4 bc	3.8 efg
F325-4	98 jk	1.00 a	424 u	63 def	9.6 pq	6.0 pq
F326-23	88 bc	2.50 b	264 f	57 c	7.1 kl	4.1 fgh
F395-10	100 k	6.25 n	391 s	83 u	7.1 kl	5.9 op
F395-2	90 cd	3.00 cd	313 l	74 mn	6.1 kl	4.5 ij

1/Tubers that passed over a 2-inch grader chain; percentage based on number of tubers.

Cetas table 2. Specific gravity and percentage of tubers with various defects of potatoes grown in soils naturally infested with the organisms associated with Verticillium wilt on Long Island, 1969, (4 replicates, 20 hills, 12-inch spacing). 1/

Variety	Specific gravity ^{2/}	Pinkeye		Stemend browning		Hollow heart	Knobs	Growth cracks	Internal necrosis
		Pct.	Score	Pct.	Score				
Chieftain	622	0.0	.00 ^a	22.2	0.25 ^{a-d}	--	0.1	0.0	--
Chippewa	560	2.7	.06 ^{b-g}	58.2	0.99 ⁿ	0.0	0.7	0.9	2.0
Houma	740	0.0	.00 ^a	10.9	0.15 ^a	0.0	1.6	0.0	0.0
Katahdin	598	4.4	.11 ^{f-i}	69.5	1.61 ^p	10.0	1.9	0.0	0.0
Katahdin	598	4.1	.09 ^{d-h}	66.2	1.26 ^o	10.0	1.1	0.6	0.0
Kennebec	560	32.7	.76 ^m	80.4	1.83 ^q	--	6.0	1.5	--
Keswick	700	5.6	.14 ^{hi}	35.5	0.53 ^{fgh}	2.0	0.9	0.0	0.0
Ona	692	0.2	.01 ^{ab}	13.1	0.21 ^{ab}	0.0	2.2	0.5	0.0
B5415-6	680	0.6	.02 ^{abc}	18.0	0.25 ^{a-d}	14.0	10.8	0.8	0.0
B5415-6	695	0.2	.00 ^a	23.7	0.24 ^{abc}	22.0	9.8	0.1	0.0
BR6315-4	562	27.7	.44 ^l	78.0	1.25 ^o	2.0	1.8	1.0	2.0
NY-30	572	11.2	.32 ^k	37.3	0.54 ^{gh}	14.0	2.4	0.5	4.0
NY-36	642	13.2	.25 ^j	77.4	1.52 ^p	4.0	1.9	0.3	4.0
NY-38	560	8.7	.13 ^{hi}	51.8	1.32 ^o	10.0	0.0	0.0	0.0
NY-39	635	0.2	.01 ^{ab}	42.4	0.69 ^{i-l}	2.0	2.1	0.0	0.0
NY-40	690	1.4	.10 ^{e-h}	46.2	0.79 ^l	6.0	12.3	10.8	0.0
NY-41	648	10.0	.17 ⁱ	55.0	1.04 ⁿ	10.0	0.1	3.0	2.0
NY-42	642	7.8	.10 ^{e-h}	64.5	1.30 ^o	0.0	4.0	5.5	0.0
NY-43	705	5.5	.10 ^{e-h}	46.1	0.77 ^{kl}	34.0	2.1	2.2	0.0
NY-44	578	9.2	.12 ^{ghi}	65.6	0.95 ^{mn}	6.0	0.7	0.3	0.0
NY-45	712	0.2	.01 ^{ab}	26.7	0.33 ^{cde}	18.0	1.5	0.1	0.0
F 5-3	637	22.3	.05 ^{a-f}	75.0	1.89 ^q	2.0	2.1	2.3	0.0
F 8-11	778	0.0	.00 ^a	24.9	0.40 ^{ef}	0.0	0.5	0.3	6.0
F 8-23	692	9.1	.12 ^{ghi}	29.7	0.65 ^{h-k}	0.0	4.6	0.0	2.0
F 9-31	770	1.8	.03 ^{a-d}	27.9	0.37 ^{de}	10.0	1.1	0.1	0.0
F10-14	722	19.3	.30 ^k	39.8	0.59 ^{hi}	6.0	1.6	0.0	0.0
F21-14	688	0.0	.00 ^a	27.4	0.43 ^{efg}	0.0	2.4	0.1	22.0
F23-23	650	2.8	.05 ^{a-f}	78.9	2.12 ^r	68.0	0.4	1.5	0.0
F30-8	645	5.4	.08 ^{c-h}	44.3	0.69 ^{i-l}	---	6.7	1.2	---
F118-1	630	0.2	.01 ^{ab}	23.7	0.35 ^{cde}	72.0	2.1	0.0	0.0
F289-11	710	0.0	.00 ^a	17.0	0.32 ^{b-e}	8.0	16.5	0.2	0.0
F293-10	575	0.2	.01 ^{ab}	43.0	0.75 ^{ijkl}	2.0	0.0	5.0	0.0
F325-4	795	0.0	.00 ^a	39.7	0.62 ^{hi-j}	0.0	5.5	0.5	0.0
F326-23	822	1.8	.04 ^{a-e}	28.9	0.45 ^{efg}	---	13.6	0.8	---
F395-10	675	0.0	.00 ^a	61.3	0.83 ^{lm}	0.0	0.1	1.3	2.0
F395-2	742	0.2	.01 ^{ab}	56.3	1.04 ⁿ	22.0	0.6	11.1	0.0

1/ --- Data not taken. 2/ 1.0 omitted from all specific gravity readings.

NEW YORK

R. L. Plaisted and L. C. Peterson

The objective of the New York breeding program is to produce varieties resistant to the golden nematode, with tubers relatively free from after-cooking-darkening, yields comparable to that of Katahdin, and these basic factors combined with one or more of the following: scab resistance, Verticillium wilt resistance and good chipping qualities.

The growing season, while generally characterized as dry, started with a more than adequate supply of moisture becoming dry in the period of late July through October. We experienced a mild autumn and most of the harvesting was completed before killing frost occurred.

In the primary phase of the selection program, 30,000 seedlings were tubered in the greenhouse. About 28,000 were grown in the field for the first time from which more than 2,000 were saved. This number will be substantially reduced following the after-cooking-darkening tests and golden nematode susceptibility trials. A thousand selections were grown in the first year, 12-hill plots and about 175 were saved for the first year yield trials.

In the secondary phase of the program, 130 selections were grown in a replicated plot at Ithaca and 14 were saved (New York table 1). In the second stage of yield trials, conducted at Ithaca and Riverhead, 63 selections, including 10 obtained from the USDA, were grown and 11 were saved for further evaluation (New York table 2). In the third year of yield trials, at Ithaca and Riverhead, 20 selections were grown and 6 saved for further testing (New York table 3).

Ten advanced NY selections were grown at Ithaca, Riverhead, Wayland and Cato, New York. Included in the test at Wayland were ten USDA selections, the same as those grown in Long Island tests. The results of these tests are given in New York tables 4 through 7. All of the selections included in these tests are resistant to the golden nematode.

Yields of the advanced selections relative to those obtained with Katahdin in tests conducted from 1965 through 1969 are given in New York table 8. Again, as in previous years, NY-41 was outstanding in yield. Its performance in comparison to Katahdin in tests conducted over the years of 1966 to 1969 are given in New York table 9. It is expected that this selection will be released as a variety.

The population of S. andigenum was advanced another generation by selecting the most desirable tuber and foliage types from 6,000 seedlings. This population has been tested for field resistance to late blight and for resistance to scab and Verticillium wilt.

New York table 1. Selected clones from first stage of yield selection, 1969, Ithaca, New York.

4 Replications of 15' plots 10" spacing							
Selection	Yield Per Acre				Specific Gravity	<u>1/</u> Chip	Disease Resistance
	Total Yield	Yield > 1 7/8	Yield > 2 1/4	Yield > 2 1/4			
	Cwt.	Cwt.	Cwt.	Pct.			
Katahdin*	315	312	279	88	80		
H93-2	387	382	330	85	84	-	VW(2),GN(A)
93-3	414	398	340	82	79	+	GN(A)
107-11	254	252	231	91	76	+	VW(4)
131-18	379	373	322	85	89	+	GN(A)
138-1	329	312	243	74	95	+	GN(A),VW(4)
161-1	378	368	310	82	81	+	GN(A)
162-3	371	363	312	84	76	+	GN(A)
162-4	375	362	264	70	81	+	GN(A)
186-10	315	303	249	79	82	+	GN(A)
213-7	353	348	310	88	96	+	GN(V)
234-7	388	371	290	75	84	+	GN(A)
463-1	290	287	247	85	80	+	GN(A)
474-4	338	332	282	84	78	+	
479-7	330	323	283	86	80	+	
LSD ₀₅	45	45	48				

* Entered five times

1/ 1.0 omitted

2/ Chip - = not likely to chip light color

+ = may chip light color

++ = should chip light color

New York table 2. Selected clones from second stage of selection, 1969, Ithaca: 4 replications of 15' plots - 10" spacing. Riverhead: 4 replications of 15' plots - 9" spacing.

Yield Per Acre						<u>1/</u> Chips	Disease Resistance
Selection	Loc.	Total Yield	Yield > 2 7/8	Yield > 2 1/4	Yield > 2 1/4		
		Cwt.	Cwt.	Cwt.	Pct.		
Katahdin	Ith.	307	301	271	88	83	
(4 times)	Riv.	342	328	276	81		
G50-7	Ith.	402	386	338	84	80	- GN(V)
	Riv.	420	402	331	79		
88-21	Ith.	340	338	307	90	77	- GN(V)
	Riv.	332	322	265	80		
92-6	Ith.	405	390	348	86	91	- GN(V)
	Riv.	474	451	381	80		
93-18	Ith.	405	396	358	88	82	- GN(V)
	Riv.	535	528	489	91		

continued

New York table 2 continued.

94-12	Ith.	410	403	355	86	78	-	GN(V)
	Riv.	578	566	511	88			
164-1	Ith.	357	324	248	69	82	-	GN(A,V)
	Riv.	356	333	264	74			
404-8	Ith.	328	329	309	94	76	-	GN(A)
	Riv.	304	299	280	92			
481-14	Ith.	309	306	267	87	84	-	GN(A)
	Riv.	294	283	242	82			
694-14	Ith.	391	380	332	85	80	-	
	Riv.	454	421	329	73			
B5287-16	Riv.	316	307	253	81			GN(A)
BR6321-1	Riv.	319	304	259	81			GN(A)
LSD ₀₅	Ith.	50	54	58				
	Riv.	92	90	89				

1/ 1.0 omitted.

New York table 3. Selected clones from third stage of selection, 1969, Ithaca: 6 replications of 20' plots--10" spacing. Riverhead: 6 replications of 20' plots--9" spacing.

Selection	Loc.	Yield Per Acre				Specific Gravity	Chips	Disease Resistance
		Total Yield	Yield > 1 7/8	Yield > 2 1/4	Yield > 2 1/4			
		Cwt.	Cwt.	Cwt.	Pct.			
Katahdin	Ith.	321	306	277	86	76		
(2 times)	Riv.	361	352	293	81			
F8-11	Ith.	391	364	307	79	93	--	GN(A)
(NY-46)	Riv.	509	488	396	78			
F9-31	Ith.	397	376	332	85	88	+	GN(A),VW
	Riv.	485	471	408	84		-	
F289-11	Ith.	377	359	327	87	87	-	
	Riv.	453	429	364	80			
F293-10	Ith.	358	345	325	91	71	-	VW
	Riv.	260	253	217	83			
F325-4	Ith.	358	338	299	84	83	-	GN(A)
(NY-47)	Riv.	489	459	382	78			
F395-10	Ith.	390	371	325	83	72	-	GN(A),VW
(NY-48)	Riv.	387	365	309	80			
LSD ₀₅	Ith.	30	32	36				
	Riv.	85	86	83				

1/ 1.0 omitted.

New York table 4. 1969 clones, 4 replications of 20' plots (except Riverhead which is 4 replications of 20' plots, 2 rows wide).

Selection	Total Yield (Cwt/A)									
	Ithaca		Riverhead	Wayland		Cato		Avg.		
	9"	12"	9"	9"	12"	9"	12"	9"	12"	
Katahdin	376 ^a	367 ^a	392 ^b	201 ^a	153	165	208	284	264	
Peconic	386 ^a	356 ^a		240	216	211	225	279	266	
Wauseon				237	203	174	210	205	207	
NY-30	500	493	565	299	262	258	244	406	333	
NY-36	452	441	406	284	252	223	232	341	309	
NY-38	378	381	416	277	214	200	208	318	268	
NY-39	413	414	369	250	235			344	325	
NY-40	415	367	431	230	213			359	290	
NY-41	433	457	528	272	211	225	248	386	334	
NY-42	412	418	478	257	235			382	327	
NY-43	428	386	501	269	229	229	212	357	276	
NY-44	491	492	455	276	218	250	273	368	328	
NY-45	420	424	452	261	214	218	221	338	286	
B5287-16				276				276		
BR6321-1				217				217		
LSD ₀₅	44	35	71	38	41	36	56			

a = Entered twice, b = Entered three times

New York table 5. 1969 clones, 4 replications of 20' plots (except Riverhead which is 4 replications of 20' plots, 2 rows wide).

Selection	Yield > 2 1/4" (Cwt/A)									
	Ithaca		Riverhead	Wayland		Cato		Avg.		
	9"	12"	9"	9"	12"	9"	12"	9"	12"	
Katahdin	327	325	333	109	95	99	142	217	187	
Peconic	293	274		109	101	115	165	172	180	
Wauseon				121	128	65	114	93	121	
NY-30	408	421	425	190	185	178	184	300	263	
NY-36	378	393	316	163	164	116	160	245	239	
NY-38	333	344	372	211	171	134	124	263	210	
NY-39	326	335	286	149	165			254	250	
NY-40	348	330	390	154	156			297	243	
NY-41	370	396	492	197	129	172	194	308	240	
NY-42	345	353	423	183	177			317	265	
NY-43	348	317	410	179	157	155	150	273	208	
NY-44	373	399	341	158	152	128	161	250	237	
NY-45	374	370	381	179	144	139	167	268	227	
B5287-16				150				150		
BR6321-1				150				150		
LSD ₀₅	49	36	79	34	46	36	52			

New York table 6. 1969 clones, 4 replications of 20' plots (except Riverhead which is 4 replications of 20' plots, 2 rows wide)

Selection	Ithaca		Yield $\geq 1 \frac{7}{8}$ " (Cwt/A)		Wayland	Cato		Avg.	
	9"	12"	Riverhead 9"	12"		9"	12"	9"	12"
Katahdin	360	353	380	171	135	139	180	263	223
Peconic	364	335		197	186	172	201	244	241
Wauseon				203	183	136	168	170	176
NY-30	471	465	528	272	240	222	219	373	308
NY-36	423	425	383	248	232	192	200	312	285
NY-38	360	366	412	259	201	174	175	301	247
NY-39	386	388	355	221	215			321	301
NY-40	377	350	424	211	197			371	274
NY-41	410	430	521	255	171	204	228	348	276
NY-42	380	391	465	236	219			360	305
NY-43	392	256	480	240	203	203	190	329	216
NY-44	460	450	427	240	201	208	228	334	293
NY-45	401	396	439	240	194	193	200	318	263
B5287-16				241				241	
BR6321-1				197				197	
LSD ₀₅	44	38	75	37	46	37	57		

New York table 7. 1969 clones, 4 replications of 20' plots (except Riverhead which is 4 replications of 20' plots, 2 rows wide)

Selection	Ithaca		Pct. $\geq 2 \frac{1}{4}$ "		Wayland	Cato		Avg.	
	9"	12"	Riverhead 9"	12"		9"	12"	9"	12"
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Katahdin	87	88	85	54	62	61	68	72	73
Peconic	76	77		45	47	55	73	59	66
Wauseon				51	63	37	55	44	59
NY-30	82	85	75	64	71	69	75	73	77
NY-36	84	88	78	58	65	52	69	69	74
NY-38	88	90	89	76	80	67	60	80	77
NY-39	79	81	77	60	70			72	76
NY-40	84	90	91	67	73			81	82
NY-41	85	87	93	73	61	77	78	82	74
NY-42	84	84	89	71	75			81	80
NY-43	81	82	82	67	68	68	71	75	74
NY-44	76	81	75	57	70	51	59	65	70
NY-45	59	87	84	69	67	64	76	69	77
B5287-16				54				54	
BR6321-1				69				69	

New York table 8. Yields 2 1/4" relative to Katahdin in the same trial.

	<u>NY-38</u>	<u>NY-40</u>	<u>NY-41</u>	<u>NY-43</u>	<u>NY-45</u>	<u>F8-11</u>	<u>F9-31</u>	<u>F289-11</u>	<u>F293-10</u>	<u>F325-4</u>	<u>F395-10</u>
<u>1965</u> Ithaca	118										
<u>1966</u> Ithaca Riverhead	120 109	110	126	106							
<u>1967</u> Ithaca Riverhead Wainscott	109 136*	105 129	113 217	152 138	109 176	109	112	109	107	105	116
<u>1968</u> Ithaca Riverhead Wainscott Steuben	105 97 147 118**	114 111 112	134 158 183	116 116 165	114 94 156	119 164	118 131	112 129	91 115	136 182	92 119
<u>1969</u> Ithaca Riverhead Steuben Cato	102 106 112 194 180 135 87	106 102 117 141 164	113 122 148 181 136 174 137	106 98 123 164 165 157 106	114 114 114 164 152 140 118	111*** 135	120*** 139	118*** 124	117*** 74	108*** 138	117*** 105
<u>Average</u> Upstate Long Island	125 120	120 117	137 177	130 136	126 135	113 150	117 135	113 127	105 95	116 160	108 112

* Yield 1 7/8"

** Yield 2"

***10" spacing

New York table 9. Performance of NY-41 (E121-2) NLF-1 x 56N18-4

	Total NY-41 Kat. Cwt. Cwt.		Yield Per Acre						Specific Gravity		
			> 1 7/8"		> 2 1/4"		> 2 1/4"		NY-41	Kat.	
			NY-41 Cwt.	Kat. Cwt.	NY-41 Cwt.	Kat. Cwt.	NY-41 Pct.	Kat. Pct.			
1966											
Ithaca 10"	562	449			524	416			71		73
1967											
Riverhead 10"	422	231		212	364	168			62		73
Ithaca 10"	456	410	396		423	376					
1968											
Riverhead 9"	698	453	647	434	600	379			77		75
Ithaca 10"	547	433	527	408	497	370					
Wainscott 9"	487	310			429	234					
1969											
Riverhead 9"	528	392	521	380	492	333					
Ithaca 9"	433	376	410	360	370	327			79		75
Ithaca 12"	457	367	430	353	396	325					
Wayland 9"	272	201	255	171	197	109					
Wayland 12"	211	153	171	135	129	95					
Cato 9"	225	165	204	139	172	99					
Cato 12"	248	208	228	180	194	142					
Average 9"	386	284	348	263	308	217					
Average 12"	334	264	276	223	240	187					

- 137 -

1/ 1.0 omitted

NEW YORK
J. B. Sieczka and E. E. Ewing

Results of Potato Variety Trials in Upstate New York

Five variety trials were conducted by the Vegetable Crops Department of Cornell University in 1969.

Four of the 1969 variety trials were conducted on mineral soils in Erie, Wyoming, and Tompkins Counties. Two others were initiated on muck soil in Wayne and Madison Counties. However, an unusually wet spring adversely affected stands at both locations and meaningful yield data was not obtained. Specific gravity readings and comments on tuber type were obtained from the Madison County trial.

Upstate New York table 1 contains the results of a trial to determine the effect of 3 within row spacings and 2 fertilizer rates on 4 promising new varieties and Katahdin. The newly released varieties used in the trial were Peconic, Jewel, Lenape and Norchip. Seed of these 4 varieties were spaced at 9 and 12 inches. Katahdin seed was spaced at 6 and 9 inches. The closer spacing for Katahdin was due to its characteristically low tuber set. Seed used in the trial was splitter size except for the Jewel and Katahdin varieties. Seed tubers of Jewel had to be cut into 3 seed pieces. Only seed pieces cut longitudinally through the cluster of eyes at the apical end were used. Katahdin seed was "B" size. All seed pieces and tubers weighed approximately 1 1/2 ounces. The high rate of fertilizer was equivalent to 2500 lbs. of 10-20-20. The low rate was equivalent to 1500 lbs. of 10-20-20.

The effect of fertilizer rate and seed spacing varied between varieties. The results indicate that fertilizer rates above 1500 lbs. of 10-20-20 have little effect on the marketable yield of the 5 varieties tested. Likewise, spacing had little effect on marketable yield. However, there appeared to be a trend for slight yield increases at the high fertilizer rate and the closer spacing. Norchip and Peconic showed the greatest response to additional fertilizer.

N.Y.-30 produced the highest marketable yield for the second consecutive year in the Freeville trial (Upstate New York table 3). Unfortunately, tubers of this seedling appear to be susceptible to internal necrosis.

B5415-6 is a Verticillium wilt resistant seedling which also yielded in the top three last year. Tubers of this selection are round with a slightly russeted white skin. Size distribution is similar to Katahdin. It had a higher percentage of hollow heart than Katahdin in this trial.

N.Y.-36 yielded well but tended to air crack. Wauseon, a Golden Nematode resistant variety, yielded above Katahdin. Tubers of this variety are round to oblong with a slightly scurfy white skin. Apical eyes are moderately deep. B5698-8 and B6316-7 also produced yields similar to Katahdin. Tubers of B5698-8 are round, small to medium sized with a bright white skin and shallow eyes. B6316-7 had the highest specific gravity in the trial. It produced small to medium sized tubers which were slightly irregular in shape.

The lowest yield and mean tuber weight was recorded for B4557-2. N.Y.-38 produced the highest percent oversize tubers and B4523-8 had the highest percentage misshapen tubers.

Sable looks very promising in the Erie County trial (Upstate New York table 2). This variety produced oblong tubers which were uniform in size and shape, with very shallow eyes and an attractive appearance. Skin color was not as bright as Chippewa. Tubers of the Alamo variety had a bright skin but were affected with lenticel spot. Superior was similarly affected.

B6097-9 is a midseason to late maturing variety which produced attractive long white skinned tubers with shallow eyes.

Table 5 contains specific gravity readings of 5 red varieties tested in Madison County. Norchief produced tubers similar in size and shape to Norland, but the color was more intense. Chieftain produced slightly larger sized tubers but color was not as deep. Tubers of the Pioneer variety were long with shallow eyes and a light red scurfy skin. Viking produced large sized tubers which had some growth cracks.

Total yields of six processing varieties are presented in Upstate New York table 4. Peconic, Norchip, and Katahdin were the highest yielding varieties. Peconic produced tubers which were uniform in size and shape and had a small percentage of sunburn tubers. Norchip was the earliest maturing variety in the trial. This variety and Katahdin produced a considerable number of sunburned tubers. Growth cracks were also observed on the Norchip variety. Only a slight amount of growth cracks were noted for Jewel. Tubers of Lenape and Russet Rural were relatively free of defects.

STORAGE TRIAL RESULTS

Preliminary storage trials on the 1969 crop have been initiated. A number of internal sprouts have been observed on the variety Norchip. Also several internal roots were noted in Wauseon.

The results of the 1968 storage trials are presented in Upstate New York table 6. Lenape, Monona, Norchip, Jewel and Oromonte produced very light chips when stored at 50° F. When the potatoes were stored for a period of 3 weeks at 40° and then at 50° for 1 week, relatively light chips were obtained from Monona and Lenape.

N.Y.-30, Jewel, B5415-6, Kennebec, B5422-10, and Russet Burbank were relatively free of after-cooking darkening. Lenape and Katahdin were most susceptible.

Lenape developed the greatest amount of sprouts. Norchip and Oromonte also sprouted early.

Rate of fertilizer application had no effect on chip color of Peconic and Katahdin varieties (Upstate New York table 7). Lighter chips were obtained from Peconic.

Upstate New York table 1. Variety, fertilizer and spacing trial.

Treatment	Total Cwt/A	US No. 1 2"-4" Cwt/A	U. S. No. 1					Pct of Total Weight		Sunburn	Specific Gravity
			2	2-3	1/4	Mis-					
						3	4+	shapen			
Norchip	363	290	11.1	67.1	12.7	.3	3.8	5.0	1.092		
Hi 12	349	280	8.0	56.5	23.7	.9	3.8	7.1	1.086		
Lo 9	341	274	15.2	72.7	7.4	-	2.4	2.2	1.088		
Lo 12	332	268	10.2	65.4	15.2	.3	3.5	5.4	1.090		
Average Norchip		278									
Peconic	375	288	15.4	71.5	5.4	-	.4	7.4	1.086		
Hi 12	352	269	9.6	63.6	12.7	.3	1.7	12.1	1.089		
Lo 9	347	273	13.3	67.2	11.4	.5	.6	7.0	1.085		
Lo 12	339	257	13.7	69.3	6.5	-	.5	10.0	1.085		
Average Peconic		272									
Jewel	337	271	15.3	72.2	8.3	.6	1.6	2.0	1.089		
Hi 12	330	277	10.9	70.6	13.5	-	1.8	3.2	1.086		
Lo 9	346	278	15.9	74.4	6.1	-	2.1	1.5	1.091		
Lo 12	312	250	15.9	72.1	8.0	-	1.2	2.1	1.087		
Average Jewel		270									
Katahdin	320	246	16.0	70.8	6.1	-	.7	6.3	1.083		
Hi 9	318	256	11.4	67.8	12.5	.3	.5	7.3	1.079		
Lo 6	328	255	17.0	75.0	2.8	-	.5	4.7	1.081		
Lo 9	326	279	8.4	76.4	9.1	-	.2	5.9	1.084		
Average Katahdin		259									
Lenape	285	230	16.7	69.6	11.1	.6	1.0	.8	1.096		
Hi 12	265	219	14.3	68.3	14.5	-	1.1	1.9	1.097		
Lo 9	275	225	15.7	68.2	13.5	-	1.2	1.4	1.100		
Lo 12	257	208	16.2	69.7	11.1	-	1.7	1.3	1.101		
Average Lenape		221									

Low rate of fertilizer is equivalent to 1500 lbs/A of 10-20-20. The high rate is equivalent to 2500 lbs/A of 10-20-20.

Planted May 7, 1969
Killed September 3, 1969

Upstate New York table 2. Erie County variety trial.

Variety	Mean Tuber Weight	Cwt/A		U.S. No. 1				U.S. No. 1				Pct. of Total Weight				Sun- burn	Scab	Specific Gravity
		Total Yield	U.S. No. 1	2-3			1/2	2"	2-3	1/2	3	1/2-4	4	Mis- shapen				
				2-3	1/2	3												
															1/2			
Sable	6.1 oz.	339	250	22	22	13.5	74.6	6.4	1.0	3.3	1.5	1.066						
Chippewa	4.7 oz.	332	266	7	7	14.2	79.9	2.1	.8	1.3	1.3	1.067						
Alamo	4.7 oz.	314	227	22	22	12.2	72.1	6.9	1.2	1.8	7.1	1.067						
Superior	4.4 oz.	281	217	9	9	15.8	77.3	3.2	.7	1.5		1.077						
B6097-9	4.2 oz.	327	199	2	2	34.2	60.9	.6	2.5	1.7		1.084						

D .05 (Tukey)

(42)

(46)

Planted 4/28/69

Harvested 8/14/69

- 141 -

(.005)

Upstate New York table 3. Variety trial, Freeville, New York. 1969^{1/}

Variety	Total Yield Cwt/A	U.S. No. 1 Cwt/A		Mean Tuber Wt. (Oz.)	Specific Gravity	^{2/} Vine Maturity
		2-3 1/4	3 1/4-4			
N.Y. 30	546	399	55	5.6	1.074	7
B5415-6	508	330	117	6.1	1.080	8
N.Y. 36	526	368	68	6.0	1.089	5
Wauseon	475	299	95	5.7	1.082	6
B5698-8	470	348	33	4.5	1.074	6
Katahdin	457	283	91	6.3	1.083	5
BR6316-7	499	359	10	4.7	1.093	3
Kennebec	573	281	69	7.7	1.089	6
B4523-8	459	289	37	6.8	1.077	5
N.Y. 38	466	172	140	6.6	1.092	5
Russet Burbank	424	297	113	6.4	1.092	2
B4557-2	444	293	1	3.7	1.093	5
(Guard) ^{3/}						
N.Y. 39	618	408	62	5.2	1.084	2
D.05 (Tukey)	77	65	130		.009	

Variety	Percent of Total Yield					^{4/} Hollow Heart Pct.	^{4/} Internal Necrosis Pct.
	2	2-3 1/4	3 1/4-4	1 lb.	Sun- burn	Mis- shapen	
N.Y. 30	10	73	10	2.4	3.7	1.2	0
B5415-6	5	65	23	3.0	3.0	1.5	26
N.Y. 36	6	70	13	3.5	4.7	3.7	3
Wauseon	8	63	20	1.0	7.9	1.4	0
B5698-8	16	74	7	0.8	1.7	0.7	0
Katahdin	5	62	20	1.4	8.7	1.3	18
BR6316-7	21	72	2	-	2.4	2.0	10
Kennebec	4	49	12	9.0	19.8	6.8	3
B4523-8	6	63	8	5.5	3.2	13.4	0
N.Y. 38	4	37	30	15.3	11.5	1.7	9
Russet Burbank	15	70	3	3.2	1.0	8.1	0
B4557-2	31	66	0.2	-	2.1	1.2	0
(Guard) ^{3/}							
N.Y. 39	12	66	10	2.4	2.8	1.8	-

^{1/} Planted May 23, within row seed spacing 9", between row spacing 34", 1000 #/A of 10-20-20 applied in the fall and 700 #/A of 15-15-15 applied at planting; irrigated 3 times; harvested September 26.

^{2/} Vines rated for maturity August 28, 1-9: 9 completely dead, 1 completely green.

^{3/} Guard rows, not included in A.O.V.

^{4/} At least 10 of the largest tubers of each variety were cut in each of the 4 replications to determine interior quality. All oversize tubers were cut.

Upstate New York table 4. Wyoming County variety trial.

<u>Variety</u>	<u>Yield Per Acre</u>	<u>Specific Gravity</u>
Peconic	393 a	1.086
Norchip	393 a	1.084
Katahdin	374 ab	1.077
Russet Rural	346 bc	1.083
Jewel	337 c	1.089
Lenape	311 c	1.097
hsd - .05	44.0	.008

Planted June 26, within row spacing 9", between row spacing 36", 1800 lbs. of 6-12-12-2 applied at planting.

Harvested September 2.

Upstate New York table 5. Madison County.

<u>Variety</u>	<u>Specific Gravity</u>
Pioneer	1.0700
Viking	1.0685
Chieftain	1.0652
Norchief	1.0647
Norland	1.0642

Upstate New York table 6. Variety trial, Freeville, N. Y., 1968. Storage and cooking results.

<u>Variety</u> ^{1/}	<u>Chip Color</u> ^{2/} <u>Agtron Meter Readings</u>		<u>After-Cooking</u> <u>Darkening Rating</u>	<u>Sprout Weight as</u> <u>Pct. Tuber Weight</u>
	50°	50° -40°-50°	1/20/69	3/20/69
N.Y. 30	41	20	9.0	1.4
Lenape	69	46	7.9	7.4
B5415-6	48	24	8.8	3.4
N.Y. 31	26	13	8.5	1.6
Jewel	62	38	8.9	2.1
Norchip	64	33	8.5	5.0
Kennebec	55	26	8.8	2.0
B5422-10	50	31	8.8	3.9
Katahdin	58	20	7.8	2.2
Monona	67	50	8.6	2.5
Oromonte	60	30	8.2	5.0
Russet Burbank	54	38	8.8	.7
(Guard Rows)				
B6024-3	53	30		
6 RF 1	47	30		
D.05 (Tukey)	(10)	(14)		(2.4)

^{1/} Varieties ranked in descending order of U.S.No.1 yields (see 1968 report)

^{2/} Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.5 gave readings of 0 and 100 respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would

continued

Upstate New York table 6 continued. (Footnotes)

probably range from 55 to 65. Samples were divided into 2 groups. One group was stored at 50° F. from time of harvest until time of chipping on January 2. The other group was stored under the same conditions until December 2, when it was placed in 40° F. storage until December 23. The potatoes were then stored at 50° F. until January 2.

- 3/ Five tubers from each of 4 field replications were peeled, dipped in 0.5% sodium bisulfite, cooked for 7 minutes in an autoclave at 15 p.s.i., and rated from 1-9, where 1 = severe after-cooking darkening; 9 = no darkening.

Upstate New York table 7. Variety x fertilizer trial. 1968. Chipping tests.

<u>Variety and Fertilizer Rate</u>	<u>Chip Color Agtron Meter Readings</u>
Katahdin, 1500 lbs/A of 10-20-10	47.0
Katahdin, 2500 lbs/A of 10-20-10	46.8
Peconic, 1500 lbs/A of 10-20-10	62.5
Peconic, 2500 lbs/A of 10-20-10	61.5
Katahdin vs Peconic	.005
1500 lbs/A vs 2500 lbs/A	n.s.
Variety x Fertilizer	n.s.

NORTH CAROLINA
F. L. Haynes

The primary objective of the breeding program is the development of early-maturing varieties with superior chipping quality for production in the Coastal Plain. The acreage being devoted to production for chipping continues to increase.

Hybridization was conducted this year for the second time in late July in a special room fitted with lighting and temperature controls. At the mountain station where seed plots are grown, a basement storage room was converted to a crossing room by equipping it with 2 - 4 ft x 16 ft benches and lighting fixtures to deliver 1500 foot-candles at the bench surface. The lights were wired through a time clock. The room was air-conditioned with a window unit of sufficient capacity to maintain room temperature at 65° F. Using the cut stem technique with inflorescences harvested from the field plots, 15 crosses were made in sufficient quantity to produce about 10,000 seeds. Four people working 3 days made the crosses. The fruits and seeds were mature 45 days after pollination.

Approximately 8000 seedlings were grown in the greenhouse this season. These will be planted in 1970 as single hills. Eight thousand and fifty single hills were produced in the field from which 340 clones were selected for further evaluation. In addition, 120 older clones were reselected for further trial.

Advanced trials of breeding lines were conducted at 4 locations in the early commercial area. The design used was a randomized complete block with augmented entries. In addition to the North Carolina clones, the trials included USDA clones and new varieties and breeding lines from New York, Pennsylvania, North Dakota, and Nebraska. The USDA clones (B lines) included were all selections made in North Carolina from segregating families provided by the National Program.

All entries were tested for chip quality. Five advanced clones continued to exhibit superiority in yield, maturity, chip quality, and specific gravity. All advance selections will be evaluated at one or more locations in 1970.

A new project was initiated to study the adaptation to the temperate zone of diploid Andean Solanum species as potential sources of new germ plasm for commercial exploitation. Thirty families of 2 species, S. phureja and S. stenotomum, obtained from LR-1 were grown at the Fletcher Station. Two types of plantings were made: (1) tubers of from 10 to 40 clones of each family which had been selected in 1968 were planted in a block to verify normal tuberization and to produce seeds for the 1970 population, (2) 250 segregates of each family were grown in the field and selections made at harvest on the basis of tuberization, tuber size and number. Forty clones were selected from each family for the 1970 tuber planting.

North Dakota

Robert H. Johansen and Joseph E. Huguelet

Potato Crossing Program

Potato crosses were again made in the greenhouse during March and April, 1969. Two hundred and six crosses were made that involved parents with high specific gravity, bright red skin color, russet skin, yield, excellent processing qualities and good disease and insect resistance.

Greenhouse and Field Seedlings

Approximately 30,000 seedlings from 185 families were grown in the greenhouse during the summer of 1968. The planting of true seed began on June 24th and transplanting to greenhouse benches started on July 8th and was completed on August 7th.

At the Langdon Experiment Station 28,623 seedlings representing 220 families were planted on May 13th and 14th, 1969. The seedling plot was harvested on September 24th and 25th, 1969. In addition, several hundred seedling tubers received from Dr. J. Pavsek, Aberdeen, Idaho, were planted at the Fargo Experiment Station on May 27th and harvested on October 16, 1969.

Cool weather during May and June delayed plant emergence as much as 3 weeks; however, by August and September normal tuber development had occurred and by harvest approximately 1000 clones were saved for further study and evaluation. The seedlings received from Idaho were planted on a heavy Fargo clay soil type which resulted in many rough, off type tubers and only a few Idaho seedlings were selected.

Advanced Selections

Eight hundred and eighteen advanced selections were planted at Casselton, Grand Forks and Fargo. The Casselton planting was made on May 23rd and 26th, while the Grand Forks trial was planted on May 7th and the Fargo scab plot on May 1st.

Weather-wise, 1969 will go on record as a disastrous year for the increase of new advanced selections. On June 14, 5.74 inches of rain fell at Casselton. This amount of water completely submerged the plots for 24 hours and although some pumping was done the plot was still saturated with water for about 5 days. After the plot showed some drying up another 2 inches of rain fell one week later on June 22. This made approximately 8 inches of rainfall in one week and although the plots were harvested on September 14th and 15th only a limited amount of selections survived and only a few were worth saving. Generally, the late maturing selections survived the flooding and water damage during the summer and those that did survive produced tubers that were rough and quite misshapen. Only about 10-20 per cent of the selections survived the flood.

Because of the loss due to flooding at Casselton selections had to be saved at Grand Forks and Fargo for further testing and seed increase. These selections will be tuber indexed this winter for virus diseases. Samples were also sent to Florida and will be tested for virus this winter.

At harvest, scab, silver scurf and general adaptation notes were taken on selections grown at Grand Forks and Fargo.

Processing Trials

Trials were again planted in cooperation with Frito-Lay inc., Campbell Soup Company and the U.S.D.A. Processing Laboratory, East Grand Forks, Minnesota. Also, for the first time advanced selections will be tested by the Wise Potato Chip Company, Berwick, Pennsylvania.

In general, the material planted was of North Dakota and Frito-Lay origin and was planted in either 10 or 20 hill plots at the Potato Research Farm, Grand Forks, North Dakota. After harvest samples of the North Dakota selections were sent to Campbell Soup Company, Wise Potato Chip Company or sent to the Potato Processing Center, East Grand Forks, Minnesota. The Frito-Lay selections were sent only to the Processing Laboratory Center, East Grand Forks, Minnesota. Processing tests will be made on several hundred advanced selections during 1969-1970.

Several advanced North Dakota selections showed promise as chipping varieties. Table 1 shows the chip quality of the third year and older advanced selections. ND 7685-6, ND 7737-2, ND 7181-8, ND 7097-2, ND 7103-4, ND 7196-18, ND 7220-1 and ND 6993-13 Russ appear to have fair to good chip quality. Several of these selections are now being increased by foundation growers.

Chip tests were made on 10 varieties and selections grown at Grand Forks and Park River (ND Tables 2 and 3). Monona, Norchip, ND6993-13 Russ and ND5761-5 produced the lightest colored chips.

Fifteen advanced selections and 3 check varieties were sent to Campbell Soup Company. Tests in 1968-69 by Campbell Soup indicated that some selections show promise as processing varieties, however, more data is needed before these selections are released as processing varieties.

Forty-six Frito-Lay selections were planted at Grand Forks. These selections were planted in a 20 hill non-replicated plot and samples from each selection will be tested by the Processing Lab. this winter. Several Frito-Lay selections tested during 1968-69 showed excellent chip quality.

Culinary Tests

In February, 1969, a fresh sample of all of the advanced selections in the breeding program were tested for boiling and baking. In addition, all of the varieties and selections grown in trial during 1968 at Grand Forks and Park River were tested for similar qualities. From both trials several hundred tests for different culinary tests such as sloughing, texture, etc., (ND Tables 4 and 5) were made. Many of the varieties and selections exhibited good culinary qualities; however, several of the low specific gravity varieties and selections were quite unsatisfactory. The russet selections ND6993-13 Russ and ND6925-13 Russ were good for both boiling and baking.

Promising Selections

Promising advanced selections were again distributed to several foundation potato growers. At least one tuber of the most promising selections was distributed to growers in the Beach area. An increase program is also carried out with several growers in the Red River Valley.

Of the selections distributed in the past years ND7196-18, ND6925-13 Russ and ND6993-13 Russ continue to look promising. ND7196-18 is quite similar to Norchip in chip quality and yield, while ND6925-13 Russ and ND6993-13 Russ are promising russet selections. ND6925-13 Russ will produce tubers that are quite

blocky, while ND6993-13Russ produces longer shaped tubers. ND6993-13Russ could be slightly susceptible to growth cracking, however, this defect can be graded out. Other selections showing some promise are the early russet selections ND7003-2Russ and ND5761-5. ND6948-14R is an attractive red but growers in the Beach area have found internal discoloration in its tubers and it does have very low specific gravity.

Variety Trials

Replicated variety trials were again grown at Grand Forks, Park River, Minot, Williston and Carrington. At Carrington dryland and irrigated trials were planted. The trials at Minot and Williston were under the supervision of B. Hoag and E. French. Mr. H. Olson conducted the trials at Carrington while at Park River, Mr. Wayne Grinde was in charge. At Grand Forks Mr. Don Uhlir was in charge of general care and maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Twenty-five varieties were planted at Grand Forks, Park River and Carrington. At Minot and Williston eighteen varieties and selections were tested. Marketable yields consisted of all U.S. No. 1 tubers over 1 7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting and harvest dates of each location were as follows:

<u>Location</u>	<u>Spacing</u>		<u>Fertilizer</u>	<u>Soil Type</u>	<u>Planting</u>	<u>Harvest</u>
	<u>Row</u>	<u>Plant</u>			<u>Date</u>	<u>Date</u>
Grand Forks	38"	12.0"	300#/A 16-16-8	Bearden clay loam	5/07	9/15
Park River	36"	12.0"	300#/A 16-16-8	Glyndon silt loam	5/06	9/16
Minot	42"	14.0"	100#/A 11-48-0	Williams loam	5/17	9/23
Williston	36"	15.0"	100#/A 16-48-20	Williams loam	5/13	9/24
Carrington	36"	9.95"	600#/A 17-17-17	Keif loam	5/19	9/22
(Irrigation)						
Carrington	36"	13.68"	600#/A 17-17-17	Keif loam	5/19	9/22
(dry land)						

The 1969 season was again quite cool and dry. Expecially dry were the months of July and August. For example, at Park River only .9 inches of rain fell during these two months. Hail or frost did little or no damage to the plots this year.

Precipitation amounts were recorded at the following locations:

<u>Location</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
Grand Forks	2.23	4.23	1.36	1.97	4.16
Minot	1.22	4.86	3.12	.98	.09
Williston	.56	3.66	2.80	1.19	.00
Carrington	2.51	5.14	2.93	1.04	2.39
Park River	.70	.99	.58	.32	1.20

Because of the dry conditions in western North Dakota the Minot and Williston trials produced very low yields. Highest yields were found at Carrington and Grand Forks. It was also dry at Park River and the yields were quite low.

Red Pontiac and Viking were again the highest yielding varieties (ND Table 6). Both of these red varieties year after year produce the highest yields in North Dakota trials. Viking is a good table-stock variety and should possibly be given more attention as a recommended variety for North Dakota. Several North Dakota table-stock growers are now planting the Viking variety with good success.

In spite of seasonal rainfall at Carrington the irrigated trial produced an overall average of approximately 100 cwt. more per acre. However, the dry matter or specific gravity was quite similar for both irrigated and non-irrigated trials.

Little differences in overall average yields were found between Kennebec, Norchip, Chieftain and Monona. ND 6993-13 Russ and ND 6925-13 Russ produced marketable yields similar to Russet Burbank. Norchief, Anoka and Russet Burbank were the lowest yielding named varieties while ND 7003-2 Russ and ND 7196-18 were the lowest yielding advanced selections. ND 7196-18 produces a large tuber set and no doubt, the dry year was detrimental to the yield of this selection. Total yields and per cent U.S. No. 1 are found in Table 6.

R 549-2554, a selection from M. C. Rutherford, Walhalla, North Dakota, did not look good in this year's trial and a selection developed by Father Reinhart Kaufman of Cary, North Dakota, resembled the Snowflake variety. ND 7218-22R was quite similar to the Norland variety but was higher in specific gravity. Norland is one of the parents of ND 7218-22R. ND 4524-4R, ND 6948-14R, ND 7103-4 and ND 5922-12R produced fairly good yields and appeared to have some promise. ND 6584-6R produced fairly good yields. ND 6584-6R has some drought resistance and on a dry year always yields well.

The highest specific gravity was found at Williston and Minot. No doubt, the dry condition in western North Dakota was responsible for the very high specific gravity occurring at these locations. Quite similar specific gravity was found for the trials grown in the Red River Valley and Carrington.

Norchip produced the highest specific gravity or dry matter (ND Table 7). Other varieties and selections averaging over 1.087 specific gravity or over 21 per cent total solids were ND 5761-5, Irish Cobbler and ND 6925-13 Russ. Lowest total solids were found for the variety Red Pontiac and the advanced selection ND 7003-2 Russ.

Of the varieties and selections tested at Carrington and the Red River Valley only the advanced selection ND 6993-13 Russ and ND 7103-4 produced quite high specific gravity (ND Table 7). ND 6993-13 Russ is higher in specific gravity than either Norgold Russet or Russet Burbank.

Disease Testing

In 1968 over 3000 selections or seedlings were indexed for PSTV (potato spindle tuber virus) using the tomato test. Of these, 417 were found to be infected. In 1969, 1141 selections, parents, or seedlings were tested and 269 were found to be infected (ND Table 8). All parent stocks are now routinely tested and those infected are replaced with healthy parents; thus the number of infected seedling lines has been reduced from 21.5% in 1968 to 8.2% in 1969. The heavy rains at Casselton caused the loss of almost all virus free stocks and therefore, the breeding program experienced a loss of one year in developing PSTV free selections. Of the few selections saved at Casselton many were of poor quality and some clones seem to be quite dormant. Therefore, in the greenhouse this winter it will not be possible to test tubers from Casselton but we will use tubers from the same selections grown at Grand Forks for the tomato test.

All tubers in ND Table 9 tested negative to PSTV and were planted in Casselton. Other tubers from the same selections were not tested for PSTV and were planted in Fargo for scab readings. Some of these clones, therefore, showed either top or tuber symptoms of PSTV either from current season infection or from infected tubers. Three tubers of all selections listed in Tables 10 and 11 were tested for PSTV as indicated under tomato test. Those which were negative were planted in Casselton (and eventually lost due to heavy rain). Two replicates of these selections, although not tested for PSTV, were planted in Fargo for scab resistance; it is interesting to note the rather high correlation of positive PSTV tubers found in the tomato tests and the high amount of PSTV field symptoms found in replicates 1 and 2. It should be emphasized that although these were the same selections in both plots, they were not the same tubers.

Both adaptation plots in Grand Forks and replicated plots in Fargo provided information on susceptibility of all selections to scab and silver scurf plus field symptoms of PSTV. This information is reported in Tables 9, 10, and 11. Each reading represents the most severe reading of the three taken and, therefore, may be considered as a rather critical evaluation of scab and scurf resistance.

N. Dak. Table 1. Chip quality of advanced N. Dak. selections.

Selection	General ^{1/} Tuber Rating	Chip Color ^{2/}	
		Agtron	Chart
ND 7685-6	3 -	41	5
ND 7686-10	3	41	6
ND 7686-15	3	39	7
ND 7692-5	3 +	19	9
ND 7698-10	3	19	11
ND 7699-12	3 +	28	9
ND 7705-5Russ	3	25	9
ND 7706-2Russ	3 +	25	10
ND 7706-5Russ	3	29	10
ND 7710-5	3 +	44	7
ND 7727-1Russ	3 +	24	9
ND 7733-14Russ	4	18	11
ND 7735-19Russ	3	18	10
ND 7737-2	3 +	40	6
ND 7755-3Russ	3 +	26	6
ND 7785-4	3 +	28	6
ND 7785-7	4	--	9
ND 7789-3	3	31	10
ND 7807-4	3	21	10
ND 7819-7Russ	3	12	11
ND 7841-7Russ	3 +	18	9
ND 7850-2	3	33	6
ND 7878-1	4 +	31	9
ND 7900-2	3 +	24	8
ND 7934-3Russ	3 +	18	9
ND 7934-5Russ	3 +	17	11
ND 7938-5Russ	3	28	8
ND 7939-1Russ	3 +	28	11
ND 8002-4	3	31	9
ND 7181-8	3	34	6
ND 7490-5	3 +	34	9
ND 7531-1	3	31	9
ND 7605-2	3	34	8
ND 7605-11	3 +	28	8
ND 7642-2	3 +	--	10
ND 7642-3	4	--	9
ND 7097-2	3 +	35	6.5
ND 7103-4	3 +	41	8.5
ND 7135-9	3 +	33	8.5
ND 7196-9R	3 +	33	-
ND 7196-18	3 +	37	7.0
ND 7220-1	3 +	41	3.5
ND 7369-2	3	26	-
ND 6989-25R	3	30	8.5
ND 6993-13R	3 +	25	7.0
ND 5979-2	3 +	47	-
Norchip	3 +	37	8.5
ND 5922-12	3 +	25	-

^{1/} General tuber rating (1 - 5). 1 Poor, 5 Excellent.

^{2/} Chip color agtron and standard chip color chart. Higher number for the agtron and lower number for the chart indicates a lighter chip color.

North Dakota Table 2. Chip tests of varieties and selections grown at Grand Forks, 1968.

Variety	Date Chipped ^{1/}									
	Jan. 14		Jan. 21		Jan. 28		Feb. 3			
	Color ^{2/} Yield ^{3/}		Color Yield		Color Yield		Color Yield			
	Chart	%	Chart	%	Chart	%	Chart	%	Photo Volt	Yield %
Cobbler	11.0	36.0	10.0	34.8	15.0	35.0	21.0	35.5	21.0	7.5
Kennebec	11.0	32.8	9.5	31.8	14.0	33.8	23.5	32.0	23.5	7.8
Monona	9.0	34.0	7.0	33.2	27.8	34.8	35.3	33.5	35.3	4.0
Norchip	11.0	35.8	9.5	34.8	24.8	35.0	27.5	36.3	27.5	6.0
ND 5761-5	11.0	35.3	10.0	36.0	21.3	34.8	28.3	34.3	28.3	7.0
ND 5922-12	11.0	33.8	10.3	34.3	15.0	36.0	22.5	34.3	22.5	7.8
ND 6127-10R	9.3	33.5	8.0	33.8	25.0	34.0	27.3	34.5	27.3	6.8
ND 6925-13Russ	9.8	34.0	10.5	32.5	11.8	31.8	14.0	35.3	14.0	10.0
ND 6993-13Russ	9.5	35.5	7.0	35.8	24.3	35.0	29.8	35.8	29.8	5.0
ND 7003-2Russ	11.0	31.3	11.0	31.5	6.8	31.8	8.0	30.5	8.0	11.0

^{1/} Chipped out of cold storage 40°F on Jan. 14, 1969, and then reconditioned at 70°F and chipped at weekly intervals.

^{2/} Standard color chart (1-11), 1 light, 11 dark; and photo volt reflectance meter (higher numbers indicate light colored chips).

^{3/} Per cent chip yield.

North Dakota Table 3. Chip tests of varieties and selections grown in state wide trials, 1968.

Variety	Date Chipped ^{1/}									
	Jan. 14		Jan. 21		Jan. 28		Feb. 3			
	Color ^{2/} Yield ^{3/}		Color Yield		Color Yield		Color Yield			
	Chart	%	Chart	%	Photo Volt	Chart	Photo Volt	Chart	Photo Volt	Yield %
Cobbler	9.8	36.3	10.5	34.3	13.5	9.5	23.0	8.0	23.0	36.5
Kennebec	11.0	34.5	10.5	32.3	19.3	7.5	18.0	8.0	18.0	33.8
Monona	9.0	34.5	6.0	32.8	28.6	5.5	36.0	4.0	36.0	35.3
Norchip	10.3	36.5	8.0	35.5	24.5	7.5	29.3	6.8	29.3	36.3
ND 5761-5	11.0	36.8	8.3	35.0	25.8	6.8	27.5	7.3	27.5	35.3
ND 5922-12	11.0	33.5	9.0	34.8	19.3	8.5	27.8	7.3	27.8	38.8
ND 6127-10R	11.0	33.8	7.5	33.8	22.3	7.3	26.3	6.0	26.3	38.0
ND 6925-13Russ	11.0	35.0	11.0	32.8	13.5	10.0	16.8	9.0	16.8	36.3
ND 6993-13Kuss	9.5	35.3	6.5	35.8	30.8	6.3	33.3	6.8	33.3	36.3
ND 7003-2Russ	11.0	33.5	11.0	33.0	7.8	11.0	8.0	11.0	8.0	31.8

^{1/} Chipped out of cold storage 40°F on Jan. 14, 1969, and then reconditioned at 70°F and chipped at weekly intervals.

^{2/} Standard color chart (1-11), 1 light, 11 dark; and photo volt reflectance meter (higher numbers indicate light colored chips).

^{3/} Per cent chip yield.

North Dakota Table 4. Cooking tests of varieties and selections grown at Grand Forks, 1968.

Variety	Boiling			Baking		
	Slough- ing	Meal- iness	Texture	Color	Texture	Color
	(1-10)	(1-10)	(1-10)	(1-10)	(1-10)	(1-10)
Chieftain	9.5	6.5	8.0	8.0	7.0	7.5
Cobbler	2.5	9.0	9.5	5.5	8.0	7.0
Kennebec	7.5	8.0	7.5	7.0	8.0	6.5
La Rouge	8.0	6.0	7.0	7.0	6.0	7.5
Monona	8.0	7.0	9.0	7.0	6.5	8.0
Norchief	7.0	8.0	7.5	7.0	7.0	9.0
Norchip	7.0	9.0	8.5	8.0	8.0	8.0
Norgold Russet	5.5	9.5	9.5	10.0	9.0	9.5
Norland	7.5	7.0	7.5	8.0	7.5	9.0
Red Pontiac	8.0	6.0	6.5	8.0	6.5	6.5
Russet Burbank	7.0	7.0	8.5	7.5	7.0	8.0
Viking	9.0	6.5	7.5	8.5	6.5	7.5
ND 5761-5	3.5	9.5	10.0	9.0	7.0	9.5
ND 5922-12	4.0	7.5	7.5	7.0	4.5	7.0
ND 6127-10R	5.5	7.0	8.0	7.0	5.5	7.0
ND 6584-6R	8.0	6.5	7.5	7.5	6.0	7.5
ND 6925-13Rus	4.5	9.5	10.0	9.5	8.0	8.0
ND 6948-14R	7.5	6.0	6.5	6.5	4.5	9.5
ND 6993-13Rus	4.0	7.0	9.0	8.0	6.0	6.5
ND 7003-2Rus	6.5	6.5	7.0	7.0	9.0	8.0

1/ (1 severe sloughing, 10 no sloughing).

2/ (1 not mealy, 10 very dry and mealy).

3/ (1 poor texture, 10 good texture).

4/ (1 dark color, 10 very white color).

5/ (1 dark color, 10 very white color).

6/ (1 poor flavor, 10 good flavor).

North Dakota Table 5. Cooking tests of varieties and selections grown at Park River, 1968.

Variety	Boiling			Baking		
	Slough- ing (1-10)	Meal- iness (1-10)	Texture (1-10)	Color (1-10)	Texture (1-10)	Color : Flavor (1-10)
Chieftain	9.0	4.5	6.0	7.5	5.5	4.5 8.0
Cobbler	3.0	8.0	7.5	5.0	5.0	3.0 8.0
Kennebec	7.0	3.5	6.5	5.0	5.5	6.5 7.5
La Rouge	9.0	5.5	5.5	5.5	4.0	4.5 8.0
Monona	6.5	6.0	6.5	8.0	7.0	4.5 6.0
Norchief	6.0	7.5	7.5	7.5	5.5	6.5 8.0
Norchip	8.0	8.0	8.0	7.0	4.5	8.0 7.5
Norgold Russet	4.5	8.5	7.0	10.0	8.0	8.0 9.0
Norland	8.0	5.0	6.5	7.0	5.5	6.0 8.5
Red Pontiac	8.5	5.5	5.5	6.5	5.5	5.5 8.0
Russet Burbank	8.0	10.0	9.0	7.0	5.0	8.0 8.0
Viking	9.0	7.0	6.0	8.0	6.0	7.0 6.0
ND 5761-5	7.0	8.0	8.0	8.0	6.5	8.0 8.0
ND 5922-12	5.5	3.5	7.5	5.5	4.0	5.5 7.5
ND 6127-10R	8.0	8.5	8.0	8.0	5.5	8.0 8.5
ND 6584-6R	8.5	4.0	5.5	6.5	5.0	8.0 8.0
ND 6925-13Russ	3.5	8.5	8.5	9.0	8.5	9.0 9.0
ND 6948-14R	10.0	4.0	6.0	7.0	5.5	4.5 6.5
ND 6993-13Russ	4.5	9.5	8.5	7.5	7.0	8.0 8.5
ND 7003-2Russ	6.0	5.5	7.5	7.0	6.5	5.0 8.0

1/ (1 severe sloughing, 10 no sloughing).

2/ (1 not mealy, 10 very dry and mealy).

3/ (1 poor texture, 10 good texture).

4/ (1 dark color, 10 very white color).

5/ (1 dark color, 10 very white color).

6/ (1 poor flavor, 10 good flavor).

North Dakota Table 6. Marketable and per cent U.S. No. 1 yield of varieties and selections grown in state-wide trial, 1969 (cwt per acre).

Variety	Grand Forks			Park River			Carrington Dryland			Carrington Irrigation			Minot			Williston			Ave.
	% U.S.			% U.S.			% U.S.			% U.S.			% U.S.			% U.S.			
	cwt/A	No. 1		cwt/A	No. 1		cwt/A	No. 1		cwt/A	No. 1		cwt/A	No. 1		cwt/A	No. 1		
Red Pontiac	231	96		187	92		224	92		357	90		180	87		123	91		217
Viking	177	94		157	94		270	93		429	91		131	94		133	96		216
Kennebec	223	97		156	92		194	94		351	90		167	85		81	87		195
Norchip	178	89		131	75		247	93		339	91		148	83		114	81		193
Chieftair	208	94		133	78		247	92		358	93		110	74		99	82		193
ND 6584-6R	188	95		147	89		203	92		347	89		133	96		98	91		186
Monona	164	94		122	87		236	92		378	94		123	86		94	88		186
Norland	166	93		87	68		230	91		345	91		120	79		104	85		175
Cobbler	123	85		142	86		215	90		352	88		109	79		103	89		174
ND 6948-14R	188	90		147	77		203	83		347	87		133	87		98	82		172
Norgold Russet	163	90		99	73		213	88		341	88		107	77		84	77		168
Norchief	147	81		114	76		190	87		287	89		96	71		55	76		148
Anoka	148	91		82	74		177	90		303	93		93	76		69	88		145
ND 5761-5	107	85		87	63		186	91		274	90		98	55		96	81		141
Russet Burbank	102	82		70	54		179	87		256	91		99	74		63	61		128
ND 6925-13Russ	136	80		51	49		155	79		263	79		92	60		53	60		125
ND 7196-18	102	65		54	50		105	61		199	70		77	63		57	58		99
ND 7003-2Russ	72	63		36	46		145	78		218	81		53	53		22	58		91
R 549-2554	208	95		177	90		224	91		337	90								237
ND 5922-12	180	91		115	80		247	93		326	92								217
ND 7218-22A	158	88		97	73		225	88		331	89								203
ND 4524-4R	159	96		139	86		196	92		298	93								198
ND 7103-4	145	88		72	53		218	89		266	88								175
ND 7240-9	103	77		69	64		217	88		268	84								164
ND 6993-13Russ	124	75		58	61		157	84		267	86								152
Father Reinhart	140	91		99	85		150	91		217	80								152

North Dakota Table 7. Specific gravity^{1/} of varieties and selections grown in state wide trials 1969.

Variety	Grand Forks	Park River	Carrington		Minot	Williston	Ave.
			Dryland	Irrig.			
Norchip	92	88	85	81	100	100	91.0
5761-5	84	86	81	80	101	108	90.0
Cobbler	89	89	88	86	92	100	89.0
ND 6925-13 Russ	84	86	84	79	91	95	86.5
ND 7196-18	79	83	82	77	102	92	85.8
Kennebec	79	79	77	77	96	105	85.5
Russet Burbank	78	80	80	80	96	99	85.5
Norgold Russet	85	83	79	76	91	95	84.8
Anoka	84	86	80	72	91	96	84.8
Norchief	81	82	75	77	95	96	84.3
Monona	78	82	74	72	96	101	83.8
Chieftian	75	81	76	71	94	97	82.3
Viking	79	80	74	71	87	97	81.3
ND 6584-6 R	77	76	75	68	83	89	78.0
Norland	79	73	74	68	84	92	77.7
ND 6948-14R	71	73	71	68	84	86	75.5
Red Pontiac	71	70	68	67	84	90	75.0
ND 7003-2 Russ	69	76	72	65	76	82	73.3
ND 6993-13 Russ	88	90	83	77			84.5
ND 7103-4	88	85	87	77			84.3
ND 7218-22 R	86	85	80	76			81.8
ND 4524-4 R	80	79	80	74			78.0
ND 7240-9	79	82	80	71			78.0
R 549-2554	75	78	74	71			74.5
Father Reinhart	71	84	77	65			74.3
Average	80	82	78	74	91	96	
LSD 1%	006	006	005	005	006	009	
5%	005	005	004	004	005	006	

^{1/} 1.0 in the specific gravity is omitted.

N. Dak. Table 8. Number of selections and total number of tubers tested and the number found to be infected with PSTV and PVX by the tomato and Gomphrena globosa tests respectively in 1969.

	Number Tested		Number Infected With			
			PSTV		PVX	
	Selections	Total Tubers	Selections	Tubers	Selections	Tubers
Parents	157	237	42	50	10	11
Seedlings	593	693	49	49	3	3
2nd year clones	298	939	126	170	36	48
3rd year clones	54	251	28	78	11	28
4th year and older clones	23	330	10	23	5	5
Advanced selections (large lots)	16	779	14	139	6	16
	1141	3129	269	509	71	111

N. Dak. Table 9. Scab and silver scurf resistance, PSTV field symptoms and general rating of promising second year selections for 1969, Fargo, N. D.

Selection	Scab. ¹			Scurf ² Gen.	PSTV ³		General ⁴ Rating
	Area	Type	Gen.		Top	Tuber	
8074-3	1	1	4	5	-	-	
8074-7	1	1	4	5	+	+	3+
8074-1	2	2	3	5	-	-	3+
8076-2	2	1	3	5	-	-	3+
8078-1R	1	1	4	3	-	-	3
8078-9R	1	1	4	3	-	-	3
8080-1	T	2	4	5	-	-	3
8086-3	2	1	3	5	+	+	3+
8092-1	2	2	3	5	-	-	3+
8096-4R	T	2	3	4	+	-	4
8098-2 Russ	T	1	5	5	+	N	3
8098-3 Russ	T	1	4	5	+	N	3+
8099-4 Russ	1	1	4	5	-	-	3+
8099-10 Russ	1	1	4	5	-	-	3
8100-2 Russ	1	1	4	5	-	-	3+
8100-4 Russ	1	1	4	5	-	-	3+
8100-6 Russ	1	2	3	5	-	-	3+
8101-5 Russ	1	1	4	5	-	-	3
8102-10 Russ	T	1	4	5	-	-	3
8102-11 Russ	T	1	4	5	+	+	N
8104-3R	T	2	4	4	-	-	5
8105-1R	2	1	3	3	-	-	4
8105-8	2	1	3	5	-	-	3
8106-1	1	1	4	5	-	-	3
8109-1	2	1	3	5	-	-	3
8109	T	2	3	5	-	-	3+
8119-2R	2	1	3	3	-	-	3
8124-3	T	2	3	5	-	-	3+
8134-2 Russ	1	1	4	5	+	-	N
8151-1R	1	1	3	3	+	-	4
8156-2	2	1	3	5	+	-	3+
8165-2 Russ	1	1	4	5	-	-	N
8168-2R	1	1	4	3	-	-	4
8168-6R	1	1	4	3	+	-	3+
8177-9 Russ	T	1	4	5	-	-	N
8181-2	1	1	4	5	-	-	3+
8182-2	T	3	3	5	-	-	3+
8182-3	2	1	4	5	+	-	3
8193-1	1	1	3	5	+	-	3+
8195-1	1	1	4	5	-	-	3+
8197-2	1	1	3	5	-	-	3+
8198-4R	1	1	3	4	-	-	3
8200-4R	1	2	3	3	+	-	4
8205-2	T	1	4	5	+	-	3+
8205-4	1	1	3	5	-	-	3+
8206-1R	1	1	3	3	-	-	3+
8224-2R	1	1	4	3	+	-	4+

N. Dak. Table 9. Continued.

Selection	Scab ¹			Scurf ²	PSTV ³		General ⁴
	Area	Type	Gen.		Top	Tuber	
8226-2R	1	1	4	4	-	-	4+
8231-3	2	1	3	5	-	-	3+
8239-2	1	1	3	5	-	-	3+
8247-1	1	1	3	5	-	-	3+
8249-3	1	1	3	5	+	-	3+
8249-4 Russ	1	1	4	5	-	-	3+
8253-2R	2	1	2	3	+	-	3+
8257-1 Russ	T	1	4	5	+	+	3+
8257-2 Russ	T	1	4	5	+	+	3+
8270-4 Russ	T	1	4	5	-	-	3+
8272-5R	1	1	3	3	-	-	3+
8273-1R	1	1	3	2	-	-	3+
8275-1	T	2	3	5	-	-	4
8275-2	1	2	3	5	-	-	3+
8290-2R	1	1	4	4	-	-	3+
8291-1	1	2	3	5	-	-	3+
8297-1	3	2	3	5	-	-	3+
8299-2 Russ	1	1	4	5	-	-	4
8307-5	1	1	4	5	-	-	3
8330-1	1	1	3	5	+	+	3
8352-2	1	1	4	5	+	-	3+
8377-1R	1	1	3	3	-	-	3
8379-1 Russ	T	1	4	5	-	-	3+
8381-3R	2	1	3	3	+	-	4
8381-6R	T	2	3	4	-	-	3
8390-2	T	2	3	5	-	-	3+
8390-5	1	1	4	5	-	-	3
8409-2	2	1	3	5	-	-	3+
8430-1 Russ	T	1	4	5	-	-	3+
A 6673-Russ	T	1	4	5	-	-	3+

¹ Area - percent of tuber covered; T = trace, 1 = 1-20%, 2 = 21-40%, 3 = 41-60%, 4 = 61-80%, 5 = 81-100%.

Type - 1 = surface scab, 2 = large scab, 3 = raised, 4 = pitted, 5 = deep pit.

Gen. - General scab rating, 5 = apparent high scab resistance, no scab, 4 = resistant, light scab; 3 = moderate resistance, scab present; 2 = susceptibility large areas infected; 1 = highly susceptible.

² Scurf general rating - Same as scab only in terms of silver scurf.

³ PSTV - Top and tuber symptoms of PSTV in plants prior to harvest (top) and after harvest (tuber). (N - not determined.)

⁴ General rating - overall rating of tuber at harvest 5 best, 1 poor.

N. Dak. Table 10. Scab and silver scurf resistance, PSTV field symptoms, and general rating of promising 3rd year selections for 1969, Fargo, N. D.

Selection	Scab ¹			Scurf ²	PSTV ³			General ⁴		
	Area	Type	Gen.	Gen.	Rep. 1	Rep. 2	Tomato			Rating
							1	2	3	
7824-1R	T	2	4	3	-	-	+	-	-	N
7841-7 Russ	1	1	4	5	+	+	-	-	-	N
7850-2	T	2	4	5	N	N	-	-	-	N
7849-5R	T	2	4	4	-	-	+	-	-	3
7857-7R	1	1	3	2	-	-	-	-	-	3+
7861-14R	1	1	4	2	+	-	-	-	+	3+
7861-18R	T	2	3	3	-	-	-	-	-	3+
7878-1	1	1	3	5	-	-	-	-	-	4+
7885-5R	1	1	3	3	-	-	-	-	-	4
7893-11	1	1	3	5	-	-	+	-	-	4
7900-2	1	1	4	5	+	-	-	-	+	3+
7931-5R	1	2	3	3	-	+	-	-	-	4
7934-3 Russ	T	1	4	5	-	-	N	N	N	3+
7934-5 Russ	1	1	4	5	-	-	-	-	-	3+
7938-5 Russ	1	1	3	5	-	-	-	-	-	3
7939-1 Russ	1	1	4	5	-	+	-	-	-	3+
7958-2R	1	1	4	3	-	-	-	-	-	3+
7979-3R	T	2	4	3	-	-	-	+	-	3+
7987-2R	2	2	3	3	-	-	-	-	-	3+
8002-4	T	2	4	5	N	N	-	-	-	3

¹ Area - percent of tuber covered; T = trace, 1 = 1-20%, 2 = 21-40%, 3 = 41-60%, 4 = 61-80%, 5 = 81-100%.

Type - 1 = surface scab, 2 = large scab, 3 = raised, 4 = pitted, 5 = deep pit.

Gen. - General scab rating: 5 = apparent high scab resistance, no scab; 4 = resistant, light scab; 3 = moderate resistance, scab present; 2 = susceptibility large areas infected; 1 = highly susceptible.

² Scurf general rating - Same as scab only in terms of silver scurf.

³ PSTV - Potato spindle tuber virus symptoms in tubers in 2 field replications, Fargo; Three tubers from each selection were tested on tomato and if found to be positive for PSTV they were discarded; if negative they were planted in Casselton. (N - not determined)

⁴ General Rating - Overall rating of tuber at harvest; 5 best, 1 poor.

N. Dak. Table 11. Scab and silver scurf resistance, PSTV field symptoms and general rating of promising advanced selections for 1969, Fargo, North Dakota.

Selection	Scab ¹			Scurf ²	PSTV ³			General ⁴
	Area	Type	Gen.		Rep. 1	Rep. 2	Tomato	
							1 2 3	Rating
6634-2R	1	1	3	3	-	-	- - +	3+
6647-1R	1	2	3	4	-	-	- - -	3+
6647-4R	2	1	4	3	-	-	- - -	3+
7181-8	1	1	3	5	-	-	- - -	3
7340-2R	1	1	3	2	-	-	NN N	3+
7490-5	2	2	3	5	-	-	- - -	3+
7508-4R	1	2	3	3	-	-	- - -	3
7531-1	1	1	4	5	?	?	- + -	3
7605-2	1	1	3	5	-	-	- - +	3
7605-11	1	1	4	5	-	-	- + -	3+
7631-4	1	1	3	5	+	-	- - -	3+
7642-2 Russ	1	1	4	4	+	N	- - -	3+
7642-3 Russ	1	1	4	5	-	+	+ - -	4
7097-2	1	1	3	5	-	-	- + N	3+
7103-4	1	1	3	5	-	-	- - -	3+
7135-9	2	1	3	5	-	-	- + -	3+
7196-9R	1	1	4	3	-	-	- - -	3+
7196-18	1	2	3	5	-	+	- - -	3+
7218-22R	1	1	3	2	-	-	- - -	3
7220-1	1	1	4	5	-	-	- N -	3+
7233-9 Russ	T	1	4	5	-	-	- - -	3
7240-9 Russ	T	1	4	5	-	-	N - +	3
7369-2	2	2	3	5	-	-	- - N	3
6925-13 Russ	1	1	4	5	+	N	- + +	3
6948-14R	1	1	4	3	+	N	- - +	4
6989-25	1	2	3	5	+	+	N N +	3
6993-13 Russ	2	1	3	5	+	+	+ + +	3+
7003-2 Russ	1	1	4	5	-	+	- - -	3
5979-2	T	2	3	5	-	-	- - -	3+
6594-16 Russ	2	1	3	5	+	-	- + -	3
6679-1	1	1	3	5	-	-	- - -	3+
6127-10R	1	2	3	3	-	-	- - +	3+
Norchief	1	1	4	3	+	+	- - -	2
Norchip	1	1	3	5	+	+	- - -	3
5922-12	1	1	3	5	-	+	N N N	3+
Nordak	1	1	3	5	+	-	- - -	3
Norland	1	1	4	3	-	-	- + -	3
Norgleam	2	1	3	5	-	+	- - -	3
Viking	2	1	3	4	+	+	- + -	3+
Snowflake	1	1	3	5	+	+	+ + -	3
Norgold	1	1	4	5	+	+	+ + -	4
2672-1P	1	2	3	3	+	N	- - N	N

Footnotes on following page.

N. Dak. Table 11. Continued.

Footnotes:

- 1 Area - percent of tuber covered; T = trace, 1 = 1-20%, 2 = 21-40%, 3 = 41-60%, 4 = 61-80%, 5 = 81-100%.
Type - 1 = surface scab, 2 = large scab, 3 = raised, 4 = pitted, 5 = deep pit.
Gen. - General scab rating: 5 = apparent high scab resistance, no scab;
4 = resistant, light scab; 3 = moderate resistance, scab present;
2 = susceptibility large areas infected; 1 = highly susceptible.
- 2 Scurf general rating - Same as scab only in terms of silver scurf.
- 3 PSTV - Potato spindle tuber virus symptoms in tubers in 2 field replications, Fargo: three tubers from each selection were tested on Tomato and if found to be positive for PSTV, they were discarded, if negative they were planted in Casselton. (N - not determined.)
- 4 General Rating - Overall rating of tuber at harvest; 5 best, 1 poor.

OHIO
Floyd Lower

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University with the Ohio Potato Growers' Association and local growers. Nine varieties were each replicated twice on each of four farms and three times on each of two other farms. Four other varieties were used on some of the farms.

Each plot consisted of two rows, in each of which fifty seed pieces were planted. Seed spacing varied from eight and one-half to eleven inches in the row and from 32 to 36 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture and spraying. Planting dates varied from May 2 to May 31. The seed was cut shortly before planting in each case and was dusted with polyram.

Fertilizer practices varied somewhat but were generally an equivalent of about 1,000 to 1,400 pounds of 8-16-16 per acre with additional nitrogen plowed down on four of the six farms. Herbicides and systemic insecticides were used on all of the farms. Four of the farms were equipped to irrigate but only one needed to do so this year. Silt loam constituted the soil types.

Moisture conditions were generally good except that on three farms excessive amounts of rain fell at one time and injured some replicates, particularly of certain varieties. Because of adequate rain in the spring and through June and July the plants apparently did not root as deeply as in some years and when the hot period hit in the last half of August without sufficient rain at that time the plants in some cases matured quickly. This may have reduced the yield of some of the early varieties.

Satisfactory stands were obtained except for Lenape and Jewel which averaged 70% of the seed pieces growing as compared to all other varieties averaging 88%. Stands were satisfactory for these varieties in prior years.

Very little virus or wilt disease was present this year. Mild mosaic developed in Norchip in August on at least two farms. Platte was infected with early blight on two farms but not as severely as in 1967. A small amount of scab was found in Peconic on five of the six farms. A slight amount was also found on one farm only of the varieties Superior, Katahdin, N.Y. 30 and Platte.

The marketable grade used throughout would practically meet the requirements of U.S. No. 1. A fifty-pound sample from each replicate was graded. Ohio table 1 summarizes the average data for all replicates of all farms by variety, listed in the order of maturity. The percent of perfect stand, weight of 40 tubers indicating the approximate size, percent grading size B, percent grading culls, major defects, percent marketable, and the marketable yield in Cwt. per acre as well as in bushels per acre, are included in the table.

Ohio table 2 gives the yields of marketable potatoes, in Cwt. per acre, by farm and by average of all farms for 1969. These are listed in order of average yield for each farm. N.Y. 30 and Shurchip led in yield on five of the six farms. In 1968 Lenape led in yield but the poor stand in 1969 undoubtedly accounts for lower yield this year.

Penobscot, Shurchip, Lenape, Superior, and Monona had the highest percentage graded as marketable. Varieties averaging above Katahdin in yield for all of the farms were N.Y. 30, Shurchip, Superior, Platte, LaChipper, and Peconic. Katahdin is used as a standard variety for comparison.

Ohio table 3 lists the average yields of marketable potatoes for each of the seven years and the seven years' average. It includes varieties used in 1969 and in three or more years of the seven years. Of the 21 varieties listed N.Y. 30 and Shurchip placed first and second but had but one year's trial. Lenape led the list in 1968. The varieties averaging above Katahdin in yield in this table are N.Y. 30, Shurchip, Lenape, Kennebec, Penobscot and Ona. In 1968 Lenape, Ona, Penobscot, Norchip, Peconic, and Alamo yielded above Katahdin. Apparently new white varieties are now appearing with high yielding ability.

Ohio table 1. Summary of average data for all replicates and all farms, by variety--1969
(listed in order of maturity).(nearest even whole figures)

Variety	Stand	Weight of 40 Tubers		Culls	Major ^{1/} Defects	Marketable Tubers	Marketable Yield Per Acre
		Pct.	Lbs.	Pct.			
<u>Early</u> Alamo	89		13.8	8.0	Sh. Gr. Cr.	77	282
	86		15.3	3.7	Sh. Gr.	89	302
<u>Medium early</u> LaChipper	89		13.5	6.3	Gr. Sh.	86	301
	88		13.9	5.1	Sh. Gr.	88	300
Platte	86		16.6	4.3	Cr. Gr. Sh.	89	284
<u>Midseason</u> Peconic	91		12.2	6.1	Gr. Sc.	81	287
	87		13.5	6.4	Sh. Gr.	86	391
N.Y. 30	92		13.9	6.0	Gr. Sh. Cr.	77	279
Norchip	87		17.9	1.6	Gr. Sh.	84	284
Katahdin	82		16.0	1.5	Sh.	92	425 ^{2/}
Penobscot	90		14.8	4.2	Sh. Gr.	89	382
<u>Late Midseason</u> Lenape	71		13.6	4.9	Sh. Gr.	89	266 ^{3/}
	71		13.6	6.7	Cr. Gr. Sh.	87	278 ^{3/}
<u>Late</u> Jewel	85.8		14.5	5.0		85.8	312.5

^{1/} Major defects - Sh=Shape (Misshapen) Gr.=Greening Cr.=Cracks Sc.=Scab

^{2/} Chadwick farm only

^{3/} 70% Stands

Ohio table 2. Yields of marketable potatoes, in cwt. per acre, by farm and by average of all farms--1969
(average of all replicates on each farm) (listed in order of average yield for each farm) (nearest
average cwt.)

Becker	Thompson	Michael	Tritten	Moomaw	Chadwick	Average of all Farms
N.Y. 30 440	Shurchip 431	N.Y. 30 459	Shurchip 451	N.Y. 30 306	Penobscot* 426	N.Y. 30 396.5
Shurchip 380	N.Y. 30 358	Shurchip 351	N.Y. 30 404	Shurchip 296	N.Y. 30 413	Shurchip 385.1
Katahdin 364	Superior 333	Superior 345	Alamo 328	Platte 260	Superior 406	Superior 307.8
Alamo 361	LaChipper 330	Peconic 322	Peconic 322	Peconic 255	Katahdin 404	Platte 301.7
Peconic 338	Platte 324	Monona 278	Platte 315	Katahdin 242	Shurchip 403	LaChipper 300.8
Norchip 329	Alamo 316	Lenape 276	Lenape 313	Lenape 242	Platte 375	Peconic 297.2
Jewel 328	Norchip 293	LaChipper 270	Superior 277	Norchip 234	Norchip 367	Katahdin 290.0
Platte 324	Jewel 291	Jewel 253	Norchip 273	Superior 211	Alamo 349	Alamo 285.6
LaChipper 303	Monona 274	Katahdin 225	Katahdin 253	Alamo 211	Peconic 306	Monona 284.0
Monona 288	Katahdin 252	Platte 213	Jewel 196		Monona 296	Norchip 281.9
Lenape 280	Peconic 239	Norchip 194			Lenape 293	Lenape 273.9
Superior 274	Lenape 238	Alamo 150			Jewel 284	Jewel 270.4
Average 334	306	278	324	251	360	309

* Penobscot not included in the average because of being on only one farm.

Ohio table 3. Average yields in cwt. per acre of marketable potatoes for each of seven years and for all years tested, 1963 - 1969

(Varieties grown more than two years and those grown in 1969) Average of all Farms, (Listed in order of maturity)											
No. Reps. VARIETY	1963 9	1964 10	1965 8	1966 8	1967 10	1968 13	1969 14	IN SEVEN YEARS		AVERAGE Cwt/A for yrs. tested	ORDER OF YIELD
								No. Yrs. Tested	Total No. Replicated		
Haig								3	31	230.51	21
Cobbler	213.34	244.14	250.55	203.82	254.23	233.49		3	27	236.01	20
Alamo						298.28	285.6	2	27	291.94	12
Superior	213.06	261.15	289.28	255.00	283.25	268.99	307.8	7	72	268.36	15
Snowflake	245.87	276.49	284.64	194.94				4	35	250.48	18
Norgold		263.37	259.22	220.86				3	26	247.82	19
LaChipper	252.44	316.30	325.62	281.89	324.50	271.96	300.8	7	64	296.22	10
Platte					314.60	272.79	301.7	3	37	296.36	9
Monona				228.72	287.88	230.58	284.0	4	39	257.79	17
Peconic						304.62	297.2	2	27	300.91	8
N. Y. 30							396.5	1	14	390.6	1
Arenac	261.21	257.15	332.36	201.96				4	35	265.17	16
Penobscot				221.52		307.50	425.5-4 e p	3	25	318.17	5
Norchip											
Katahdin	297.04	217.84	404.82	269.70	346.64	306.56	281.9	2	27	294.23	11
Shurchip						284.07	290.0	7	72	301.44	7
Kennebec	273.29	252.52	394.29	289.98	386.22		385.1	1	14	385.00	2
Lenape					325.91	363.14	273.9	5	45	319.26	4
Jewel							270.4	3	39	320.98	3
								1	9	270.4	14
Sebago	242.27	267.77	374.26	225.18	298.79						
Ona	278.56	246.69	401.53	234.36	349.99	318.54		5	45	281.65	13
								6	58	304.94	6
AVERAGE ALL LOTS LISTED	255.00	260.34	331.66	235.66	317.20	288.38	312.5			292.04	

PENNSYLVANIA
Clarence S. Bryner
Elmer C. Pifer, Melvin Henninger

In 1969 Extension variety demonstrations were conducted in the following counties and regions: Erie county, northwestern region; Potter county, north central region; Somerset county, southwestern region; York county, southeastern region; and Schuylkill, Lehigh and Northampton counties, east central region. Ten varieties were evaluated for yield and specific gravity.

Cultural Information and Rainfall

<u>County</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Planting-Harvest Period-Days</u>	<u>Total Rainfall Inches for Period</u>
Erie	5/23	10/9	139	10.94
Lehigh	4/29	10/1	155	23.15
Northampton	4/26	10/4	161	26.40*
Potter	5/16	9/25	132	15.61
Schuylkill	4/28	10/7	162	20.60
Somerset	5/7	10/6	152	17.38
York	4/22	9/19	150	20.00

* Includes 2.40 inches by irrigation

All demonstrations were designed as randomized blocks with four replications. Seed pieces of each variety were hand planted in single 25-foot row plots, 9 inches apart within the row. Rows were 34 inches apart. Seed pieces of Norland were planted in 5-foot breaks between plots to identify the plots at harvesttime. Total yields were recorded at harvest and tubers were graded for size over 2 inches.

Specific fertilizer applications at each location were made on the basis of soil test results obtained from the University Soil Testing Laboratory. Recommendations were made to achieve a yield of 300 cwt. per acre.

The fertilizer recommendations were:

<u>County</u>	<u>Plow Down</u>	<u>Row</u>
Erie	100 lbs. Nitrogen	400 lbs. 15-15-15 3% Mg O
Lehigh	70 lbs. Nitrogen	700 lbs. 16-8-8
Northampton		700 lbs. 16.25-13-7
Potter		850 lbs. 15-15-15
Schuylkill	800 lbs. 10-10-10	1500 lbs. 10-10-10
Somerset	500 lbs. 10-10-10	600 lbs. 10-20-10
York		1200 lbs. 16-8-8

Pennsylvania table 1 continued.

Northampton County

6 HS-9	343	321	94	1.064
Norchip	357	277	78	1.070
Kennebec	310	277	89	1.061
Lenape	313	264	85	1.081
6 CX-6	273	242	89	1.069
Superior	274	225	82	1.067
Norland	259	211	82	1.057
Katahdin	233	208	89	1.057
6 RF-1	228	182	80	1.061
Russet Rural	<u>106</u>	<u>50</u>	<u>47</u>	<u>1.062</u>
Average	270	226	77	1.065

Potter County

6 RF-1	514	485	94	1.074
Kennebec	472	444	94	1.079
6 HS-9	440	426	97	1.072
Superior	398	375	94	1.077
6 CX-6	390	360	93	1.077
Norchip	399	360	90	1.078
Russet Rural	389	332	85	1.080
Katahdin	317	288	91	1.071
Norland	321	266	83	1.065
Lenape	<u>319</u>	<u>259</u>	<u>81</u>	<u>1.081</u>
Average	396	360	90	1.075

Schuylkill County

6 RF-1	480	432	90	1.071
6 HS-9	446	423	95	1.072
Norchip	442	411	93	1.077
Kennebec	424	399	94	1.072
6 CX-6	403	374	93	1.076
Superior	380	365	96	1.068
Katahdin	387	360	93	1.073
Russet Rural	407	342	84	1.074
Lenape	319	303	95	1.090
Norland	<u>324</u>	<u>301</u>	<u>93</u>	<u>1.060</u>
Average	401	371	93	1.073

Somerset County

6 RF-1	604	567	94	1.073
Kennebec	556	550	99	1.070
Katahdin	507	496	98	1.071
6 CX-6	507	491	97	1.079
Russet Rural	503	488	97	1.075
6 HS-9	494	474	96	1.070
Norchip	437	402	92	1.075
Lenape	406	390	96	1.090
Superior	396	364	92	1.071

continued

Specific Gravity Determinations

Specific gravity was determined with the use of a potato hydrometer. Single varietal samples composited from four replications were taken at each location for the determinations.

The data was obtained in cooperation with Dr. W. R. Mills, Potato Breeder, Department of Plant Pathology.

Results of Demonstrations

Data for the seven county trials in Pennsylvania are shown in Pennsylvania table 1.

Demonstrations conducted by the Pennsylvania State University, College of Agriculture Extension Service.

Clarence S. Bryner, Extension Agronomist

Elmer C. Pifer, Extension Agronomist (retired)

Melvin Henninger, Agronomy Graduate Research Assistant

Pennsylvania table 1. Tuber yield and specific gravity determinations obtained on 10 potato varieties in Pennsylvania County Extension Demonstrations, 1969.

Variety	Total Yield Cwt.	Yield No. 1 Cwt.	No. 1 Pct.	Specific Gravity
<u>Erie County</u>				
6 RF-1	359	334	93	1.088
6 HS-9	311	292	94	1.087
Kennebec	299	275	92	1.090
Russet Rural	277	260	94	1.094
Norchip	277	255	92	1.091
6 CX-6	259	243	94	1.096
Superior	262	241	92	1.083
Katahdin	235	211	90	1.091
Lenape	228	209	92	1.099
Norland	170	151	89	1.070
Average	268	247	92	1.089
<u>Lehigh County</u>				
6 HS-9	522	505	97	1.074
6 RF-1	554	465	84	1.070
Kennebec	431	390	91	1.070
Norchip	454	363	80	1.076
Superior	370	355	96	1.076
6 CX-6	391	350	90	1.074
Katahdin	387	342	88	1.065
Lenape	343	306	89	1.088
Russet Rural	360	257	71	1.072
Norland	297	256	86	1.050
Average	411	359	87	1.072

Pennsylvania table 1 continued.

Norland	277	249	90	1.059
Average	469	447	95	1.073
York County				
6 HS-9	415	-	-	1.064
Kennebec	411	-	-	1.069
Norchip	409	-	-	1.074
6 RF-1	404	-	-	1.065
Superior	361	-	-	1.070
Russet Rural	329	-	-	1.065
Katahdin	329	-	-	1.062
6 CX-6	301	-	-	1.065
Lenape	299	-	-	1.086
Norland	250	-	-	1.055
Average	351	-	-	1.067

* Yield No. 1 and Percent No. 1 data not available for York.

Average		*	
7 Demonstrations	Total Yield	No. 1	Specific Gravity
	Cwt.	Pct.	
6 Rf-1	449	89	1.072
6 HS-9	424	95	1.072
Kennebec	415	93	1.073
Norchip	396	87	1.077
6 CX-6	361	93	1.076
Superior	349	92	1.073
Katahdin	342	91	1.070
Russet Rural	339	80	1.075
Lenape	318	90	1.088
Norland	271	87	1.059
Average	366	90*	1.073

* Percent No. 1 data for 6 demonstrations only.

PENNSYLVANIA

J. D. Harrington and F. J. McArdle :

Potato variety trials were conducted at Pennsylvania Furnace in Centre County (central) and Manheim in Lancaster County (southeast) in 1969. The Centre County trial was conducted at the Department of Agronomy Research Farm. Experimental site in Lancaster County was on a grower cooperator's farm.

Experiments were conducted on soils characterized as follows: deep; heavy; well-drained; slightly acid, pH 6.2 in Centre County and alkaline, pH 7.3 in Lancaster County; high fertility. However, on the basis of soil test, soils were low in available phosphorus. At planting, 150-300-150 lb/A of N, P_2O_5 , and K_2O , respectively, was applied. Varietal seed pieces (4-cut, except whole "b" size Kennebec seed) were machine planted with an experimental assist--feed planter between 9- and 10-inches apart within the row (3 feet between rows) while simultaneously banding fertilizer and a systemic insecticide within 25-foot long single row plots. Thirty seed pieces per plot were planted. Three-foot open breaks were maintained between plots. During the growing season recommended cultural practices were employed.

Seed of seventeen varieties was secured from the Maine Department of Agriculture. Certified "b" size seed of Kennebec was also grown in Maine. Seed of seedling numbers 6CX6 and 6HS9 was increased in Pennsylvania, and supplied by W. R. Mills, Department of Plant Pathology, Pennsylvania Agricultural Experiment Station. Additional cultural information and initial determination dates for recording experimental data is presented in tabular form as follows:

<u>County</u>	<u>Prior Crop</u>	<u>Planted</u>	<u>Stand Count</u>	<u>Maturity</u>	<u>Tops Killed</u>	<u>Harvested</u>
Centre	Timothy	5/2	6/18	9/10	9/10	9/23
Lancaster	Corn	4/29	6/11	9/11	9/22	10/6

	<u>No. of Days from Planting to Harvest</u>	<u>Weighed and Graded</u>	<u>Specific Gravity</u>	<u>Chipped</u>
Centre	144	10/16	10/27	11/12
Lancaster	160	10/23	10/28	11/13

	<u>Period</u>	<u>Total</u>	<u>Week Average</u>
Centre	5/2 - 9/23 (21 weeks)	19.46*	0.93
Lancaster	4/29 - 10/6 (23 weeks)	24.45	1.06

* Includes 3.00 inches by irrigating

Varieties within each maturity group were evaluated for eight variables, i. e., four production indices, and four tuber quality and chip indices, table 1. Specific gravity was determined by the air-and-water method. Estimates of specific gravity were converted to percent solids with the table prepared by

G. V. C. Houghland. Chip yield was determined on 8-ounce samples of peeled, washed, 1/16" sliced raw and fried potatoes. Chip color, Rd values, was determined with the Gardner Color Difference meter. Instrument was standardized against color standard C-LY-1047-57. Values 20.0 and above may be considered acceptable for marketing. After harvest varieties were maintained under enclosed storage conditions. For the ten-day period prior to chipping, varieties were stored at room conditions and at temperatures (high and low) which averaged 82° F.

A completely randomized block design with four replications was employed for each of the three maturity groups. Data were analyzed with the aid of the IBM 360 computer at the University Computation Center.

Results of the 1969 variety trials are shown in Pennsylvania, Harrington table 1.

Harrington table 1. Potato variety trials in Pennsylvania, 1969.

Variety or Seedling	Stand	Yield Per Acre				Solids	Chip Yield		Chip Color, Rd
		Total	1-7/8"	2-1/4"	lb/100		lb		
		to 4"	to 4"						
	Pct.	Cwt.	Pct.	Pct.	Pct.				
<u>EARLY MATURITY</u>									
Norchief	92	472	91	70	20.6	31.2		17.8	
Superior	94	379	94	74	20.4	29.5		19.7	
Cobbler	95	334	94	76	20.5	30.4		21.7	
B5299-39	83	320	94	80	18.8	29.4		10.3	
L.S.D. (.05)	5	79	NS	5	1.0	NS		3.0	
C.V., %	3.5	13.2	2.5	4.4	3.0	5.1		10.7	
<u>MEDIUM MATURITY</u>									
Grand Falls	89	441	91	74	22.2	31.9		19.7	
Abnaki (B5415-6)	92	388	95	86	20.2	28.8		16.2	
Norchip	96	385	91	62	22.1	32.8		22.8	
Chieftain	95	369	93	75	18.4	27.9		13.6	
Bake King	90	342	95	70	23.4	32.3		18.0	
Monona	88	340	94	77	18.8	28.3		23.9	
L.S.D. (.05)	NS	NS	2	6	0.9	1.7		4.4	
C.V., %	4.9	13.7	1.6	5.2	2.8	3.7		15.3	
<u>LATE MATURITY</u>									
Kennebec, b-size	92	516	94	76	21.2	30.6		20.4	
Kennebec	96	490	93	78	20.9	30.4		18.6	
Bintje	93	458	76	39	21.1	31.4		17.1	
6CX6	88	433	94	76	22.4	32.2		20.6	
F5459 (Raritan)	88	429	93	76	23.3	34.1		15.0	
6HS9	93	407	96	88	19.8	29.5		19.9	
Katahdin	89	400	96	87	20.4	30.4		19.6	
Peconic	92	398	92	67	21.2	30.8		19.2	
Lenape	92	358	92	72	26.0	35.8		20.5	
Wauseon	92	294	93	79	19.6	29.4		19.9	
L.S.D. (.05)	NS	66	3	5	0.7	1.3		NS	
C.V., %	4.2	11.0	2.4	4.7	2.3	2.9		14.1	

continued

Harrington table 1 continued.

LANCASTER COUNTY (Southeast)

PRODUCTION INDICES

QUALITY AND CHIP INDICES

Variety or Seedling	Stand	Yield Per Acre			Solids	Chip	Chip
		Total	1-7/8"	2-1/4"		Yield	Color,
			to 4"	to 4"		lb/100 lb	Rd
	Pct.	Cwt.	Pct.	Pct.			
<u>EARLY MATURITY</u>							
Norchief	79	339	82	47	19.2	28.3	9.9
Cobbler	82	272	91	74	19.7	30.8	20.8
Superior	80	208	92	68	18.9	29.2	18.4
B5299-39	78	179	89	62	18.8	29.8	11.8
L.S.D. (.05)	NS	33	4	9	NS	NS	3.5
C.V., %	5.6	8.3	3.1	9.3	2.6	3.8	14.4
<u>MEDIUM MATURITY</u>							
Norchip	91	304	88	54	19.8	30.1	16.6
Grand Falls	88	290	80	46	18.4	29.3	13.8
Chieftain	83	270	92	61	17.8	27.0	13.4
Abnaki (B5415-6)	85	252	92	73	18.9	28.7	13.1
Bake King	81	247	86	47	21.9	33.1	15.3
Monona	82	166	85	46	16.8	27.0	21.8
L.S.D. (.05)	NS	40	4	6	0.5	1.9	3.2
C.V., %	5.2	10.3	3.3	7.8	1.8	4.4	13.6
<u>LATE MATURITY</u>							
Kennebec	82	319	83	53	19.3	28.4	19.3
Kennebec, b-size	92	309	87	61	19.3	29.8	16.1
Katahdin	84	295	90	75	19.2	29.8	17.9
6HS9	85	257	90	70	19.6	20.1	20.3
6CX6	82	242	86	55	20.5	30.0	22.6
Bintje	86	238	44	6	21.2	32.6	23.6
Lenape	78	228	83	54	23.0	33.1	19.7
Peconic	80	225	90	64	20.0	31.0	17.0
F5459 (Raritan)	82	218	74	37	21.1	31.6	13.8
Wauseon	85	215	89	68	19.4	30.6	17.3
L.S.D. (.05)	6	38	5	9	0.7	1.6	3.1
C.V., %	5.1	10.4	4.0	11.6	2.4	3.5	11.5

continued

Harrington table 1 continued.

COUNTY AVERAGES (Varieties Combined)								
PRODUCTION INDICES					QUALITY AND CHIP INDICES			
COUNTY	Stand	Yield Per Acre			Solids	Chip		Chip Color, Rd
		Total	1-7/8" to 4"	2-1/4" to 4"		Yield	lb	
		Pct.	Pct.	Pct.		lb/100	lb	
<u>EARLY MATURITY</u>								
Centre	91	376	94	75	20.1	30.1	17.4	
Lancaster	80	249	89	63	19.2	29.5	15.2	
L.S.D. (.05)	7	74	5	NS	NS	NS	NS	
C.V., %	7.0	21.0	4.5	20.3	5.0	7.1	34.6	
<u>MEDIUM MATURITY</u>								
Centre	92	378	93	74	20.8	30.4	19.0	
Lancaster	85	255	87	55	18.9	29.2	15.7	
L.S.D. (.05)	4	38	5	9	1.1	NS	2.4	
C.V., %	5.8	16.3	6.9	19.5	7.6	6.7	18.8	
<u>LATE MATURITY</u>								
Centre	91	418	92	74	21.6	31.5	19.1	
Lancaster	84	255	82	54	20.2	30.6	18.8	
L.S.D. (.05)	3	34	6	7	0.7	NS	NS	
C.V., %	6.8	19.7	14.4	23.2	6.8	6.7	22.6	
<u>VARIETY AVERAGES (Counties Combined)</u>								
PRODUCTION INDICES					QUALITY AND CHIP INDICES			
Variety or Seedling	Stand	Yield Per Acre			Solids	Chip		Chip Color, Rd
		Total	1-7/8" to 4"	2-1/4" to 4"		Yield	lb	
		Pct.	Pct.	Pct.		lb/100	lb	
<u>EARLY MATURITY</u>								
Norchief	86	406	87	58	20.0	29.7	13.8	
Cobbler	89	303	93	74	20.1	30.6	21.3	
Superior	87	293	93	71	19.6	29.3	19.0	
B5299-39	81	249	92	71	18.8	29.6	11.0	
L.S.D. (.05)	4	41	3	5	0.6	NS	2.0	
CV., %	4.4	12.6	2.7	6.6	3.0	4.9	11.6	

continued

Harrington table 1 continued.

MEDIUM MATURITY

Grand Falls	88	366	86	60	20.3	30.6	16.8
Norchip	93	345	90	58	20.9	31.5	19.7
Abnaki (B5415-6)	88	320	94	79	19.6	28.8	14.6
Chieftain	89	320	92	68	18.0	27.4	13.5
Bake King	85	295	90	59	22.6	32.7	16.7
Monona	85	253	90	62	17.8	27.7	22.9
L.S.D. (.05)	5	42	2	5	0.5	1.2	2.6
C.V., %	5.3	13.1	2.7	7.0	2.5	4.0	15.0

LATE MATURITY

Kennebec, b-size	92	413	89	65	20.2	29.5	18.3
Kennebec	89	404	90	70	20.1	30.1	18.9
Bintje	90	348	60	22	21.2	32.0	20.4
Katahdin	87	348	93	81	19.8	30.1	18.7
6CX6	85	337	90	66	21.5	31.1	21.6
6HS9	89	332	93	79	19.7	29.3	20.1
F5459 (Raritan)	85	324	84	56	22.2	32.8	14.4
Peconic	86	312	91	65	20.6	30.9	18.1
Lenape	85	293	88	63	24.5	34.4	20.1
Wauseon	88	254	91	74	19.5	30.0	18.6
L.S.D. (.05)	4	45	3	5	0.5	1.1	2.7
C.V., %	4.5	13.3	3.1	7.8	2.5	3.4	14.2

RHODE ISLAND
Robert S. Bell

Nine numbered selections and nine named varieties were included in the 1969 trials. The potatoes were grown on a Bridgehampton silt loam soil fertilized with 2200 lbs/A of 10-10-10 fertilizer plus 150 lbs/A of ammonium nitrate plowed down with the cover crop.

The tubers were planted April 21 in rows 3 feet apart and the seed pieces were 9 inches apart in the row. There were 4 replicates of each variety which were randomized in each of 4 blocks. The tubers were dug October 20 and those used for chipping were stored in a warm room until November 20 when the chips were made.

The yields in cwt/A, specific gravities and chip color ratings are shown in Rhode Island table 1.

Rhode Island table 1. Potato variety tests, Kingston, Rhode Island, 1969.

Variety	<u>Yield Per Acre</u> ^{1/}	<u>2/</u>	<u>3/</u>
	US No. 1	Specific Gravity	Chip Ratings
	Cwt.		
Kennebec	484 a	70	5
Green Mountain	441 a	81	6
Lenape	428 ab	88	4
Burbank	373 bc	73	5
B5415-6	358 c	67	5
138-3	354 c	78	6
Chippewa	347 c	65	5
Katahdin	310 cd	70	5
6038-8	306 cd	68	5
B5131-2	266 de	68	6
Alamo	252 def	60	6
B5299-39	248 def	67	5
Cobbler	235 ef	74	4
Wauseon	234 ef	63	5
B5488-2	217 ef	59	6
B5458-6	189 f	71	5
B5647-8	182 f	65	3
B5398-4	181 f	59	6

^{1/} Duncan's multiple range test used to determine varietal significance.

^{2/} 1.0 omitted from values.

^{3/} Chip color ratings based on Coughlin's color chart. Ratings 4-6 are medium light; 9 indicates a very dark colored chip.

SOUTH CAROLINA
W. R. Sitterly

I. Replicated Yield

Purpose: To obtain varieties adaptable to coastal South Carolina.

Procedure: Field C-7, fine sandy loam, was fertilized with 1100 lbs/A of granular 10-10-10 (without trace elements) on February 21. Seed pieces of all entries were planted in a randomized block design of 4 replicates. Eptam was applied broadcast at 1.5 lbs/A, and then the seed pieces were bedded upon. Potatoes were planted on a 9" spacing, and soil contained excellent field moisture. A recommended pesticide schedule was followed throughout the growing season.

Results: The growing season was cold and dry initially and then rapidly became hot and dry during the last half of the season. Wet cold soil delayed emergence in specific field locations and thus did affect yield.

As shown in table 1, Wauseon produced a significantly higher yield than all entries except Alamo and Lenape. B5219-1 and B5230-1 produced the lowest yields in this test.

Lenape recorded a significantly higher DM% than all other entries except B5219-1 and B5222-2.

The earliest maturing entries were Wauseon and Lenape, followed closely by Alamo and B5219-1.

The nicest external appearance was produced by B5219-1, Alamo, and perhaps Wauseon.

Conclusions: Based on this test, Wauseon was the best performing entry, followed closely by Alamo (because of good appearance and fair yield) and Lenape (because of high DM, earliness, and fair yield).

Table 1. Horticultural characteristics of entries in an Irish potato variety trial (spring 1969)

Entry	Yield Per Acre	DM	Tuber Shape	Maturity	Comment
	Cwt	Pct			
B5219-1	88	18.0	Oval elongate	ME	Good appearance
B5222-2	108	18.7	Oval	M	Growth cracks and enlarged lenticels
B5230-1	88	16.4	Oval elongate	M	Rough tubers
Alamo	120	16.2	Oval elongate	ME	Good appearance
Wauseon	146	16.8	Oval	E	Fairly good appearance
Lenape	128	20.2	Oval elongate	E	Blocky and rough
LSD ₅	30	2.8			

TENNESSEE

C. A. Mullins, H. D. Swingle, and I. E. McCarty

Thirteen Irish potato varieties were evaluated for processing in 1969. These varieties were grown at the Plateau Experiment Station, Crossville, Tennessee. The experiment was planted May 1 and harvested August 13. Soil type was Hartsells fine sandy loam. Plot design was randomized complete block with four replicates. Each plot consisted of one row, 30 feet long with plants one foot apart and rows 3 feet apart. Fertilization was 6-12-12 with 1000 pounds banded and 1000 pounds broadcast.

Early growing season was excellent as temperatures and rainfall was favorable through June. Late growing season was rather hot and dry. Excellent soil tilth from previous sod crops prevented serious damage from late season unfavorable conditions.

Tennessee table 1. Yield, tuber weight, tuber length, and tuber width of 11 varieties and 2 selections.

Variety or Seedling	Yield Per Acre		Average ^{1/} Tuber	Average ^{2/} Tuber	Average ^{3/} Tuber
	Total	No. 1	Wt. (Lbs.)	Length (Ins.)	Width (Ins.)
	Cwt.	Cwt.			
Kennebec	263	213	.51	4.3	3.1
Peconic	201	150	.42	3.2	2.8
Norchip	233	189	.43	3.5	2.8
Russet Burbank	193	96	.39	4.2	2.2
Oromonte	190	139	.42	3.4	2.7
Wauseon	184	159	.45	3.7	2.8
Lenape	241	176	.37	3.3	2.8
Haig	236	199	.51	3.7	3.0
Norgold Russet	217	149	.46	4.2	2.5
Katahdin	184	137	.47	3.6	2.8
LaFouge	259	209	.39	3.7	2.7
TL 1859	212	161	.39	4.2	2.8
TL 8134	219	159	.40	3.5	2.7
L.S.D. .05	19	20	.08	0.4	0.4
L.S.D. .01	25	27	N.S.	0.5	0.5

^{1/} Average of 80 tubers

^{2/} Average of 40 tubers

^{3/} Average of 40 tubers

Tennessee table 2. Plant vigor, plant maturity, tuber appearance, tuber eye depth, specific gravity, and chip color of 11 varieties and 2 selections.

Variety or Seedling	<u>1/</u> Plant Vigor	<u>2/</u> Maturity	<u>3/</u> General Appearance	<u>4/</u> Eye Depth	Specific Gravity	<u>5/</u> Chip Color
Kennebec	4.2	3.0	2.0	2.0	1.077	7.2
Peconic	3.2	3.0	3.5	2.2	1.073	7.0
Norchip	4.2	3.5	3.5	2.0	1.078	6.7
Russet Burbank	3.5	3.2	4.2	1.2	1.079	6.8
Oromonte	3.8	5.0	3.5	1.2	1.072	7.0
Wauseon	4.0	1.0	2.2	1.5	1.062	6.3
Lenape	3.8	4.5	1.8	1.5	1.084	6.4
Haig	4.5	3.0	2.5	2.0	1.077	6.8
Norgold Russet	4.0	1.2	2.2	1.2	1.064	5.0
Katahdin	3.5	3.0	1.2	1.5	1.072	6.6
LaRouge	4.8	1.5	3.2	2.0	1.064	6.4
TL 1859	3.8	2.5	2.8	2.0	1.067	5.7
TL 8134	4.0	1.8	2.0	1.2	1.060	6.1
L.S.D. .05	N.S.	0.7	0.8	0.7	N.S.	
L.S.D. .01	N.S.	0.9	1.0	0.9	N.S.	

1/ Rating: 1 = low, 5 = high
2/ Maturity: 1 = early, 5 = late
3/ Rating: 1 = smooth, 5 = rough
4/ Eye Depth: 1 = shallow, 5 = deep
5/ Rating: 1 = poor, 9 = excellent, 6 = minimal level of acceptability

TEXAS

B. A. Perry, R. E. Webb, M. C. Fuqua, and S. D. Cotner

Screening and Evaluation of Potato Varieties
and Seedlings

Data from the potato tests conducted in Texas are reported in Texas tables 1, 2 and 3. The records are very scarce from South Texas because of extremely wet weather in spring. Of the 23 lines in the replicated tests 13 should be advanced to more extensive testing. The observational trials contained 15 lines, which are reported in Texas table 3. These were grown in single plots of 25 hills. In this test 5 should be repeated and 2 should be advanced to replicated yield trials another year.

Texas table 1. Potato trials at Dilley, Texas, 1969.

Variety or Breeding Line	Yields per Acre			Color	Shape	Skin Set	Comments
	#1	#2	Total				
	Cwt.	Cwt.	Cwt.				
G570-3	136	56	192	Red	Oblong	Good	Scab and grub damage severe in all plots.
B6097-9	83	72	155	White	Round-Oblong	Good	
Lenape	144	51	195	White	Round-Flat	Good	Accurate visual rat- ing impossible.
Norgold	45	35	80	Russet	Oblong	Good	
DT 6063-1R	77	34	111	Red	Round-Oblong	Fair	In general, skin-set excellent in all of the plots. Little or no regrowth present. Excessive rot present due to the late harvest.
Wauseon	94	25	119	White	Round	Good	
Norchip	88	41	129	White	Round-Oblong	Good	
Superior	60	48	108	White	Round	Good	
Kennebec	75	17	92	White	Oblong	Good	
G575-4	81	29	110	Russet	Round	Good	
Chieftain	106	42	148	Red	Round-Oblong	Good	
B6024-3	54	25	79	White	Round	Excellent	

Texas table 2. Replicated potato trials, Texas, 1969.

Pedigree or Variety	Munday, Texas ^{1/}			Lubbock, Texas ^{1/} ^{2/}			
	Yield Per Acre		Specific Gravity	Yield Per Acre		Specific Gravity ^{3/}	General Rec- ommendation
	U.S. No. 1			U.S. No. 1			
	Cwt.	Pct.		Cwt.	Pct.		
BRC 6463-4	137	84.6	60	93	89.0	70	R
G575-4	107	74.7	74	74	81.4	79	R
Norchip	143	83.9	78	76	80.3	76	R
B4784-1	66	60.2	76	47	86.4	79	D
BR5960-5	199	88.8	80	98	86.3	80	A
DT6063-1R	137	90.5	73	82	83.1	85	A
B5415-6	149	92.8	73	98	92.2	70	R
B5613-1	119	78.8	73	86	83.0	69	D
B6024-3	116	82.3	63	46	84.1	65	D
Chieftain	146	82.6	63	114	93.1	70	R
B6097-9	129	77.5	80	66	75.5	81	R

continued

Texas table 2 continued

Kennebec	118	73.6	68	58	78.3	76	R
BR5960-13	135	80.5	82	70	86.1	74	R
G570-3	169	91.8	68	126	93.8	85	A
Cherokee	135	86.3	72	91	88.5	83	R
G540-14	104	89.8	75	75	78.2	82	D
WC230-14	106	73.0	63	35	49.7	63	D
Norgold Russet	95	74.2	67	53	78.6	74	R
Red LaSoda	197	92.7	68	73	88.6	64	R
Superior	100	86.1	74	97	90.3	85	D
Lenape	129	89.2	92	53	87.1	73	R
B6530-2	112	80.1	71	89	86.2	89	D
Wauseon	134	84.8	72	82	81.1	78	R
168-3	20	33.1	--	29	81.0	--	D

1/ Yields are averages for 4 replications

2/ General recommendation based on total

Combined results--A = Advance; R = Repeat; D = Drop

3/ 1.0 omitted.

Texas table 3. Potato Observational Lines, Texas, 1969.

Pedigree or Variety	Munday, Texas ^{1/}			Lubbock, Texas ^{1/}			
	Yield Per Acre		Specific Gravity	Yield Per Acre		Specific Gravity	General Rec- ommendation
	U.S. No. 1			U.S. No. 1			
	Cwt.	Pct.		Cwt.	Pct.		
BR6463-4	92	58.3	69	84	73.7	72	D
BR6463-6	37	80.0	--	24	86.5	--	D
BR6491-1	152	72.5	81	38	51.4	--	R
BR6491-2	141	55.1	78	13	89.3	--	R
BR6272	84	72.7	58	97	85.3	61	D
B5630-1	167	72.7	70	31	74.1	--	R
B6024-6	37	28.0	--	21	58.0	--	D
B6122-8	136	76.5	73	5	83.3	--	D
B6159-8	107	49.4	74	40	43.2	--	D
BR6315-4	188	92.3	75	59	59.3	65	R
BR6321-10	204	87.6	65	138	98.1	83	A
BR6321-1	196	84.3	66	149	87.2	66	A
B6330-3	167	79.0	60	96	88.0	84	R
B6356-1	136	86.7	55	26	34.9	--	D
B6345-3	39	41.7	--	77	77.9	95	D

1/ 1.0 omitted.

TEXAS
R. D. Peel^{1/}, C. E. Cunningham^{1/}, R. L. Nickeson^{1/}

Cooperative Testing of Potato Varieties for Use in Soups. Potato variety trials were grown in replicated tests in four locations in Texas in 1969: Mission (South Texas), San Antonio (South Central Texas), Munday (North Central Texas) and Lubbock (Northwest Texas).

Mission (Hidalgo County). Five (5) of the numbered varieties but none of the commercial varieties outyielded the standard variety Kennebec in this trial. One (1) of the named varieties, Alamo, and several of the numbered varieties had a higher over-all rating than Kennebec. Lenape had a higher specific gravity reading than any of the varieties in this test.

San Antonio (Bexar County). Exceptionally high yields and percentage number one tubers were characteristic of this test although only one (1) variety, BR6312-2, was higher yielding than the standard variety Kennebec. With the exception of one variety, Kennebec received the lowest overall rating at this location. Lenape was again higher in specific gravity than any other variety in this test.

Munday (Knox County). Several of the numbered varieties in this test yielded as well as Kennebec but none were higher yielding. Lenape and B6097=9 had very impressive specific gravity determinations.

Lubbock (Lubbock County). Over one-half of the varieties at this location were higher yielding than Kennebec although the average performance was below normal for the area. The overall quality of Alamo and the specific gravity of Lenape, as well as several of the numbered lines, were impressive. This trial was placed on land that had received a cotton herbicide the previous year and it is felt that this reduced the potato yields considerably.

^{1/} Campbell Institute for Agricultural Research

Peel table 1. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at Mission, Texas, 1969^{1/}

Variety	Yield Per Acre		Specific ^{2/} Gravity	Overall ^{3/} Rating
	Total Cwt.	No. 1 Pct.		
B6097-9	255	74.5	77	4.0
B5598-2	250	84.4	60	4.0
BR6312-2	228	88.8	60	3.5
BR6246-2	225	81.7	70	3.5
BR6250-1	204	85.7	69	4.0
Lenape	199	86.6	84	3.5
B5090-11	188	84.2	58	4.0
Katahdin	187	86.5	63	3.5
Alamo	185	91.2	62	4.5
B5415-6	184	80.9	71	3.5
B5400-8	182	70.2	73	3.5
Kennebec	180	84.8	68	3.5
B5132-3	171	88.3	63	3.5
Wauseon	169	85.0	65	3.5
BR6265-8	164	88.9	64	4.5
BR5946-9	163	81.6	64	3.5
B6139-11	151	70.0	83	3.0
B5686-8	150	74.2	56	3.0
B5088-7	147	86.3	64	3.5
B5408-2	121	83.4	62	3.0
BR6246-1	116	64.9	60	3.0
LSD .05	23	6.4	.003	
.01	31	8.5	.004	
c.v.	13.7	5.5	.210	

^{1/} Planting date - January 23 ^{2/} 1.0 omitted
 Harvest date - May 7
 Row spacing - 38 inches ^{3/} 1 = poor to 5 = excellent
 Plant spacing - 12 inches
 Plot size - 2 rows, 12 feet long
 Plot design - Randomized block
 Replications - 4
 Fertilizer - 400# 24-8-8
 60 gal. 15-5-5 sidedress

Peel table 2. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at San Antonio, Texas, 1969^{1/}

Variety	Yield Per Acre		Specific Gravity ^{2/}	Overall Rating ^{3/}
	Total	No. 1		
	Cwt.	Pct.		
BR6312-2	340	98.6	60	3.0
Kennebec	297	97.9	72	2.5
BR6246-1	263	87.9	66	2.5
B5698-8	251	94.1	62	3.0
Alamo	249	96.8	69	4.0
B5415-6	249	98.4	74	4.0
LaSoda	238	98.5	61	3.0
B6044-14	221	97.8	80	3.0
BR5960-13	213	97.9	80	3.5
Lenape	212	94.3	93	3.5
Shurchip	212	96.6	71	3.5
B5665-7	198	95.8	77	3.0
BR5965-3	195	95.1	73	3.0
Katahdin	194	96.3	66	4.0
BR5967-7	191	99.0	83	3.5
B5647-9	189	91.0	79	3.5
BR6159-8	187	95.9	74	3.0
BR5948-1	176	94.4	82	3.0
B4469-7	172	99.1	81	3.0
LSD	.05	27	2.7	.004
	.01	36	3.6	.005
c.v.	8.6	2.0	.262	

^{1/} Planting date - February 12
 Harvest date - June 10
 Row spacing - 36 inches
 Plant spacing - 12 inches
 Plot size - 2 rows, 12 feet long
 Plot design - Randomized block
 Replications - 4
 Fertilizer - 500# 12-24-12 Broadcast

^{2/} 1.0 omitted

^{3/} 1 = Poor to 5 = Excellent

Peel table 3. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at Munday, Texas, 1969^{1/}

Variety	Yield Per Acre		Specific ^{2/} Gravity	Overall Rating ^{3/}
	Total	No. 1		
	Cwt.	Pct.		
BR6246-2	278	67.6	70	3.5
BR5970-4	269	78.0	71	3.0
BR6306-22	264	91.6	71	4.0
BR6315-4	263	87.8	71	3.5
B6097-9	262	76.1	87	4.0
Shurchip	259	86.5	75	3.0
Kennebec	249	98.7	73	3.5
Lenape	246	82.8	99	3.5
Katahdin	228	83.7	68	3.5
B5698-8	228	80.8	65	3.0
B5415-6	225	87.5	74	3.5
Alamo	219	75.5	67	4.0
B5665-7	201	80.4	78	3.5
BR6159-8	184	80.7	75	3.5
BR5946-9	176	89.8	75	4.0
B5647-9	152	51.7	74	3.5
LSD .05	33	8.1	.003	
.01	45	10.7	.004	
c.v.	10.3	7.1	.209	

^{1/} Planting date - February 25
 Harvest date - June 19
 Row Spacing - 38 inches
 Plant spacing - 12 inches
 Plot size - 1 row, 25 feet long
 Plot design - Randomized block
 Replications - 4
 Fertilizer - 950# 16-20-6-10

^{2/} 1.0 omitted

^{3/} 1 = Poor to 5 = Excellent

Peel table 4. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at Lubbock, Texas, 1969^{1/}

Variety	Yield Per Acre		Specific ^{2/} Gravity	Overall Rating ^{3/}
	Total	No. 1		
	Cwt.	Pct.		
B5665-7	184	86.1	71	3.5
B4469-7	178	92.0	84	3.5
Alamo	172	80.1	58	4.0
Lenape	172	75.2	92	3.5
B5415-6	163	86.8	59	3.0
BR6290-3	163	65.6	73	3.5
BR6290-9	158	76.4	84	3.0
BR5948-1	152	83.9	83	3.5
BR5967-7	149	90.5	81	3.5
Shurchip	149	79.9	63	3.5
BR5965-3	148	80.2	70	3.5
BR6293-12	148	77.3	83	3.5
B5698-8	124	73.3	58	3.5
B6376-6	119	91.7	69	3.5
BR6159-8	117	68.3	66	3.0
Kennebec	103	68.5	70	3.0
B5647-9	103	35.9	69	3.5
B6044-14	100	81.5	87	3.0
B6139-11	99	56.1	82	3.0
BR5960-13	99	78.2	73	3.0
Katahdin	98	86.3	52	3.5
BR6316-17	79	57.2	65	3.0
B6140-3	66	91.1	70	3.5
LSD .05	31	11.1	.004	
.01	41	14.8	.005	
c.v.	16.7	10.3	.229	

^{1/} Planting date - March 28
Harvest date - July 15
Row spacing - 38 inches
Plant spacing - 12 inches
Plot size - 1 row, 25 feet long
Plot design - Randomized block
Replications - 4
Fertilizer - 600# 16-20-0-12

^{2/} 1.0 omitted

^{3/} 1 = Poor to 5 = Excellent

VERMONT

Wilfred R. Kelly, Richard Jensen, Kenneth Atwood
Samuel C. Wiggans and Hugh Murphy

During 1969, three variety trials were conducted by the Department of Plant and Soil Science at the University of Vermont and by the Plant Pest Control Division of the Vermont Department of Agriculture. These trials were located at Grafton, Wolcott, and South Burlington. There were 19 varieties at Grafton and Wolcott and 20 varieties at South Burlington. There were five replicates in a randomized block at each location. Seed pieces of all varieties were planted by hand 9 inches apart in the row. These plantings were part of the tri-state cooperative variety trial of the National Potato Breeding Program.

The plots at Grafton were planted May 22 and harvested September 23. Fertilizer was applied at the rate of 176-88-176-39 per acre. The potatoes were grown in a light loamy soil. Moisture was adequate and yields were satisfactory (Vermont table 1).

The plots at Wolcott were planted May 26 and harvested September 22. Fertilizer was applied at the rate of 144-216-216-36 per acre. The potatoes were planted in a medium loamy soil. Moisture was adequate; however, yields were lower than expected (Vermont table 2).

The plots at South Burlington were planted June 2 and harvested October 12. Fertilizer was applied at the rate of 90-98-98-20 per acre. The potatoes were planted in a light sandy soil and irrigated as needed. Yields were better than average (Vermont table 3).

Houma was the highest yielding variety at South Burlington. It has also been a consistently high producer in past trials. The new variety, Abnaki (B-5415-6), performed satisfactorily at all three locations. Reliance was higher at Grafton than at Wolcott or South Burlington; however, it gave satisfactory yields at all three locations. The new seedling, B-6139-11, was a consistently good yielding selection at all three locations. B-5408-2 was the highest yielding selection at Wolcott while Norchip was highest at Grafton.

Vermont Table 1. Yield, percentage of yield between 1-7/8 and 4 inches,
specific gravity and total solids from 19 potato varieties
grown at Grafton, Vermont - 1969

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific gravity	Percentage total solids ^{2/}	Chip color
Norchip	369	91.8	62.6	1.073	18.74	5.2
Kennebec	349	95.6	71.1	1.070	18.10	8.1
Reliance	347	94.9	80.6	1.065	17.05	9.7
B 6139-11	341	92.7	66.7	1.081	20.43	7.2
B 5267-2	335	96.4	77.8	1.069	17.89	9.3
Bake King	332	95.1	68.1	1.078	19.79	10.0
B 5415-6	327	94.9	78.7	1.067	17.47	8.7
Peconic	327	93.9	69.5	1.072	18.53	6.4
Cobbler	316	92.8	65.4	1.070	18.10	8.2
F 5459	297	95.2	74.5	1.083	20.85	9.5
F 59103	288	96.0	79.9	1.056	15.15	8.5
F 5647	280	93.1	72.8	1.064	16.84	8.8
Katahdin	271	93.1	69.7	1.062	16.42	9.3
B 6044-14	268	92.2	57.7	1.076	19.37	9.4
B 5408-2	267	96.4	77.6	1.066	17.26	10.0
F 6124	262	92.8	65.5	1.082	20.64	7.3
B 5299-39	261	92.3	66.6	1.068	17.68	9.7
Superior	253	93.0	60.6	1.067	17.47	7.4
Sable	245	92.3	70.8	1.060	15.99	10.0
L.S.D. (0.05)	63			0.003	0.63	0.8
(0.01)	83			0.004	0.84	1.0

^{1/} Varieties arranged in descending order of yield. Seedpieces of all varieties spaced 9 inches apart.

^{2/} Calculated from Von Scheele's equations.

Planted - May 22
Killed - September 9
Harvested - September 23
Fertilizer - 176-88-176-39

Vermont Table 2. Yield, percentage of yield between 1-7/8 and 4 inches,
specific gravity and total solids for 19 potato varieties
grown at Wolcott, Vermont - 1969

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1¼ to 4 inches	Specific gravity	Percentage total solids ^{2/}	Chip color
B 5408-2	343	96.2	83.7	1.065	17.05	10.0
Katahdin	340	97.3	85.6	1.069	17.89	9.5
Kennebec	330	94.8	78.9	1.070	18.10	8.8
B 6139-11	327	94.4	73.8	1.077	19.58	8.1
B 5415-6	326	95.6	83.8	1.067	17.47	9.3
B 5299-39	323	95.0	79.9	1.061	16.21	9.6
B 5267-2	316	96.7	79.3	1.070	18.10	9.1
Peconic	310	95.7	77.6	1.074	18.95	8.3
Reliance	310	90.0	79.2	1.063	16.63	10.0
Norchip	307	94.2	65.6	1.075	19.16	5.3
Cobbler	301	92.8	69.7	1.069	17.89	9.3
Sable	292	97.5	85.2	1.062	16.42	9.6
F 59103	288	97.1	84.7	1.064	16.84	8.3
B 6044-14	276	94.8	67.4	1.077	19.58	9.1
Superior	273	97.0	75.0	1.071	18.32	7.7
Bake King	270	96.6	76.1	1.083	20.85	10.0
F 5647	255	95.1	78.1	1.071	18.32	9.3
F 5459	248	94.8	76.8	1.084	21.06	9.4
F 6124	244	95.4	74.5	1.080	20.21	9.0
L.S.D. (0.05)	59			0.003	0.63	0.7
(0.01)	78			0.004	0.84	1.0

^{1/} Varieties arranged in descending order of yield. Seedpieces of all varieties spaced 9 inches apart.

^{2/} Calculated from Von Scheele's equations.

Planted - May 26
Killed - September 8
Harvested - September 22
Fertilizer - 144-216-216-36

Vermont Table 3. Yield, percentage of yield between 1-7/8 and 4 inches,
specific gravity and total solids for 20 potato varieties
grown at South Burlington, Vermont - 1969

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1¼ to 4 inches	Specific gravity	Percentage total ^{2/} solids	Chip color
Houma	416	96.1	76.0	1.087	21.69	9.0
Green Mountain	391	96.6	65.2	1.069	17.89	9.7
B 6139-11	386	95.3	69.0	1.086	21.48	7.0
B 5267-2	380	99.1	85.9	1.076	19.37	8.7
F 5810	374	95.1	74.8	1.075	19.16	8.4
B 5415-6	374	97.9	87.4	1.082	20.64	6.6
Reliance	368	95.0	74.9	1.080	20.21	9.3
Norchip	353	94.6	62.4	1.092	22.75	6.2
F 5647	341	96.8	79.8	1.083	20.85	7.0
Kennebec	341	97.4	74.4	1.073	18.74	5.6
Peconic	325	91.1	48.0	1.098	24.01	5.0
Bake King	316	96.4	63.2	1.073	18.74	9.8
F 5459	311	98.0	81.2	1.073	18.74	9.5
Superior	304	98.2	77.6	1.079	20.00	5.6
Cobbler	289	94.3	63.3	1.085	21.27	7.4
F 59103	278	97.2	84.9	1.069	17.89	6.2
Katahdin	269	96.5	76.9	1.089	22.11	6.8
F 6124	241	93.1	59.6	1.081	21.43	6.0
Sable	240	98.3	80.9	1.074	18.95	9.1
B 5299-39	231	94.0	67.2	1.083	20.85	7.4
L.S.D. (0.05)	58			0.007	1.47	1.0
(0.01)	78			0.009	1.89	1.3

1/ Varieties arranged in descending order of yield. Seedpieces of all varieties spaced 9 inches apart.

2/ Calculated from Von Scheele's equations.

Planted - June 2
Killed - by frost
Harvested - October 12
Fertilizer - 98-98-98-20

VIRGINIA
Boyett Graves

The 1969 growing season was characterized by excessive heat sprouting of the Pungo variety which accounts for a majority of the 25,000--30,000 acres of potatoes grown in Accomack and Northampton Counties on Virginia's Eastern Shore. Snow, cold soils, and rain had its effects on very early plantings, while drought during mid-season and unseasonal rains during harvest contributed their undesirable consequences to help make the potato season something less than a big success for growers.

Growers planted trial plantings of a number of varieties in search of varieties that are more suitable than the ones commonly grown in the area.

VARIETY TRIAL PLOTS

Eastern Shore Test Plots

The test plots on the Eastern Shore were 30 feet long and replicated 5 times. One thousand pounds of 10-10-10 was band placed at planting on March 31. Phorate (Thimet) was banded at the rate of 3 pounds actual per acre. Seed pieces were hand cut, treated with 8% M-45 dust and hand planted at 12-inch spacing in 36 inch rows. Sinox herbicide was applied at drag-off at the rate of 3 pounds active material per acre. Irrigation water was applied three times during the growing season.

Plots were harvested on July 7. Tubers were size graded and weighed. Specific gravity determinations were made one day after harvest and samples for chip color determinations were bagged and shipped to Mr. James Watts, Wise Potato Chip Company, Berwick, Pennsylvania, where they were stored. Samples from each selection were chipped and evaluated at 4-5 day intervals for 7 weeks (Virginia table 2).

Norfolk Test Plots

Test plots at the Virginia Truck Experiment Station in Norfolk, Virginia, were very similar to those on the Eastern Shore. Water was available for only one irrigation at this location and the plots suffered severe drought and almost all selections were sprouted at harvest. Seed pieces were planted April 2 at 12-inch spacing in 45-inch rows and harvested July 18. Chip color evaluations and specific gravity determinations were not made from this location due to poor quality of tubers at harvest.

The varieties Alamo, Wauseon, LaChipper, and Norchip have been recommended for grower trials in 1970.

Virginia table 1. Yield, specific gravity and general appearance of potato varieties grown at two locations in Eastern Virginia.

Variety	Yield Per Acre		Specific Gravity	General Appearance	General Appearance
	Size A	Size A ^{1/}			
	E. Shore	Norfolk, Va.	E. Shore	E. Shore	Norfolk, Va.
	Cwt.	Cwt.			
Alamo	212	145	65	1.5	2.5
Wyred	192	134	55	3.0	2.0
6 HS-9	192		78	1.5	
Red LaSoda	192	149	66	2.5	3.0
Pungo	187	148	79	2.5	2.0
64 C 2-3	179		67	2.5	
Norchip	178	151	72	2.5	3.0
B5090-11	175	133	61	2.5	3.5
Wauseon	166	141	68	1.5	1.5
Reliance	162	100	63	2.0	2.0
F5208-21	158	124	80	3.5	1.5
7 Fd-4	153	116	74	2.0	1.0
7 ZY-9	151	133	72	3.0	2.5
B5132-3	149	129	68	3.0	2.5
62C3-6	143		71	2.0	
7 DL-6	135		81	2.0	
7 DL-5	131		81	2.5	
58C19-2	129		74	2.5	
Norchief	127	124	83	2.0	3.5
B5598-2	127	131	57	2.5	2.5
Lenape (Me.seed)	121	143	86	1.5	2.0
51-2	121		71	2.0	
6 NW-4	120	103	63	2.0	2.5
Superior	118	109	75	1.5	3.0
6 XJ-5	116	119	76	3.5	1.5
7 DF-1	116		76	2.5	
BR5948-1	115	124	82	3.0	2.0
Lenape (Pa.seed)	112	92	87	1.5	2.0
Cobbler	111	98	77	3.0	3.0
BR5946-9	111	117	68	2.0	1.5
7 GT-2	106	99	78	3.5	3.0
7 DL-7	106	102	77	2.0	1.5
Monona	101	80	67	3.0	2.5
B5408-2	101	78	67	2.5	3.5
B5281-1	100	89	59	1.5	1.5
Peconic	100	112	78	2.5	2.0
7DL-4	98		76	1.5	
Katahdin	97	115	61	2.0	2.0
7FG-1	90	98	87	1.5	1.5
64C2-4	75		68	2.0	
B5647-8	64	60	64	1.5	1.5
Haig	43	65	67	2.0	2.0
LSD 1%	34				

^{1/} All selections not planted in Norfolk trial due to insufficient amount of seed.

^{2/} 1.0 omitted

^{3/} General Appearance: 1.0 = excellent; 5.0 = very poor.

Virginia table 2. Chip color, sprouting at harvest, average weight per tuber, vigor rating, and maturity rating of potato varieties and seedlings grown in Eastern Virginia, 1969.

Variety	Sprouted at Harvest		Chip ^{1/} Color Rating	Av.Wt/ Tuber (Lbs)	Plant Vigor ^{3/} Rating 5/27/69	Estimation ^{2/} of Maturity
	E. Shore	Norfolk				
Alamo	No	Yes	3.3	.34	5.0	ME
Wyred	"	No	5.8	.35	4.5	L
6 HS-9	"	Yes	1.7	.41	4.5	L
Red LaSoda	"	No	3.8	.39	4.5	L
Pungo	Yes	Yes	2.1	.42	5.0	ML
64C2-3	No	Yes	2.4	.31	4.0	M
Norchip	"	Yes	1.3	.32	5.0	ME
B5090-11	Yes	Yes			3.5	ME
Wauseon	No	Yes	1.9	.42	5.0	L
Reliance	Yes	Yes	5.3	.33	4.0	ME
F5203-21	No	Yes	2.8	.31	4.5	M
7 FI-4	"	No		.28	5.0	L
7 ZY-9	"	Yes	1.7	.38	5.0	VL
B5132-3	"	Yes	4.0	.26	4.5	ME
62C3-6	"	Yes	1.9	.32	4.5	E
7 DL-6	"	Yes	2.7	.34	5.0	ML
7 DL-5	"	Yes	1.8	.30	5.0	ME
58C19-2	"	Yes	2.8	.28	4.0	E
Norchief	"	Yes	3.0	.28	4.0	ML
B5598-2	Yes	Yes		.29	4.0	M
Lenape (Me. Seed)	Yes	Yes	2.8	.30	2.5	L
51-2	Yes	Yes	3.1	.28	4.5	ME
6 NW-4	No	Yes		.32	2.5	L
Superior	"	Yes	2.0	.28	3.0	E
6 XJ-5	"	Yes		.30	4.0	ML
7 DF-1	"	Yes	1.8	.33	2.5	ML
BR5948-1	Yes	Yes	1.3	.29	3.5	M
Lenape (Pa. Seed)	Yes	Yes	2.8	.30	3.0	ML
Cobbler	No	Yes	4.9	.26	5.0	E
B5946-9	Yes	Yes	3.3	.41	3.0	ML
7 GT-2	Yes	Yes	1.4	.27	3.0	ML
7 DL-7	No	Yes	1.8	.27	3.5	M
Monona	No	No	1.4	.42	3.0	M
B5408-2	Yes	Yes		.28	4.0	ME
B5281-1	No	Yes		.68	4.0	E
Peconic	No	No	2.7		3.5	ME
7DL-4	No	Yes	1.3	.24	3.5	M
Katahdin	No	Yes	2.7	.30	3.0	ML
7FG-1	Yes	No	1.2	.26	3.5	ML
64C2-4	No	Yes	3.4		2.5	E
B5647-8	No	No			3.5	M
Haig	No	Yes			2.0	-

^{1/} Chip color rating is average of 9 determinations made during a 7-week period by J. Watts, Wise Potato Chip Company, Berwick, Pennsylvania. Individual date evaluations will be furnished on request to Boyett Graves, Virginia Truck Experiment Station, Painter, Va., 23420. Rating Scale: 1.0-4.5 = excellent to good; 5.0=undesirable but marketable; 6-14=unmarketable.

^{2/} Maturity estimations made by evaluating vine deterioration 3 days prior to harvest and by skin set at time of harvest. ^{3/}Plant Vigor: 1.0=very poor vigor 5.0=very vigorous. Determinations made on Eastern Shore planting.

WASHINGTON
Wm G. Hoyman

Parental combinations were made to obtain progeny segregating for resistance to common pathogens present in the Pacific Northwest, including Meloidogyne hapla, and for high dry matter content. Most of the parents had russet skin.

Distribution. Three hundred and thirty pounds of seedling tubers were sent to James A. Twomey, San Luis Valley Branch Station, Center, Colorado, and 115 pounds to C. W. Roath, Northwest Montana Experiment Station, Kalispel, Montana.

Early and late harvest trials. These were located in a 0.5-acre field that had grown potato annually since 1967. The Warden fine sandy loam soil was infested with Verticillium albo-atrum and Streptomyces scabies. Ammonium nitrate, treble super phosphate and potassium sulphate were broadcast before plowing to give 160, 40 and 87 pounds of N, P and K per acre, respectively. A starter fertilizer containing 53, 13 and 29 pounds of N, P and K per acre was banded at planting. The seed for each trial was cut April 6, 1969, dusted with 5% Captan and planted in a randomized block design having 10 seed pieces of each variety or selection in each of four replicates. Seed spacing was 12 inches within and 38 inches between rows. Ten percent granular disulfoton (Di-Syston) was banded at planting at the rate of two pounds active ingredient per acre. Both trials received two applications of Systox spray during June and July and the late trial had a third application in August. The early harvest trial was dug August 8 and the late trial November 7.

Washington table 1 shows there was a wide range in yield among the 27 selections and varieties. BR6317-21 yielded the equivalent of 51.4 tons per acre. Common scab infection was moderate to severe on most entries. Only Russet Burbank and Norgold Russet were scabless and a low incidence of this disease occurred on Norchip and 280-11.

Hollow heart was present in all entries except Cascade, Lenape, 280-11, 288-1, 292-1, and BR6321-1.

Specific gravity ranged from 1.073 (292-5) to 1.105 (Lenape). Norchip, a chipping variety, had a high gravity (1.092) and made the lightest colored chips. Chip score for Lenape was 5 and several others scored 6.

Not harvesting the varieties and selections until 13 weeks later (November 7) had considerable effect on yield and amount of hollow heart (Washington table 2). BR6316-7 yielded the equivalent of 54 tons per acre, and Cascade was second with 45.7 tons. BR6316-7 was also the most resistant to V. albo-atrum, and was the highest in specific gravity at 1.105. It is disappointing that it was not a better chipper. Norgold Russet was the most susceptible to V. albo-atrum.

A low percentage of hollow heart was present in most of the entries harvested August 8, but this was not the case in the late harvest trial. Only Cascade, 280-11 and 292-1 remained free while Kennebec, Lenape and Norgold Russet had 18, 7 and 12 percent, respectively.

Internal tuber browning was prevalent in Russet Burbank and three selections, while internal black spot was common in all the cultivars. The prevalence of

black spot may be due to the fact that the temperature was 50° F. when the tubers were bruised.

Black spot has not been a problem in Norgold Russet shipped from Washington, so the internal black spot score of 63 may not be realistic for this variety and the scores of other entries may be correspondingly too high. Selection 288-1 had the lowest score (23). This selection looks promising for chipping. Its chip color scores were comparable to Norchip in the late harvest trial.

Selections yielding large numbers of small tubers. Some processors have indicated an interest in obtaining varieties that produce a large number of small tubers. Many single-hill selections have been evaluated. Selections 226-3S, 242-1S, and 288-1S were increased in 1969 for further evaluation in 1970.

Norgold Russet mutation. An apparent Norgold Russet mutation was selected from a seed grower's tuber-unit planting in 1968 and increased to 148 pounds in 1969. Two years' observation of this mutant indicate the vines remain green longer and are more resistant to frost than the regular Norgold Russet. Sufficient seed will permit further evaluation of the mutant in 1970.

Resistance to Meloidogyne hapla. Due to the fact that nematode-infested soil is becoming more prevalent in the irrigated areas of the Pacific Northwest, I am breeding for resistance to M. hapla.

Parental stock is selected after it has been tested at Prosser in a field having a high population of this nematode. Washington table 4 shows there is considerable variation in the reaction of genotypes to tuber galling. Eight selections were resistant or escaped galling. Among them was the russet-skin selection A6334-20. It also has resistance to V. albo-atrum and S. scabies, and has been used extensively in my breeding project. An indication that the reactions in table 4 are realistic is the fact that Norgold Russet had 1.1% of its tubers galled, while Russet Burbank had 40.3%. The latter variety has had a high percentage of its tubers galled when grown at this particular site, while Norgold Russet has been relatively free of tuber galls.

Effect of planting date on incidence of tuber galls. Norgold Russet and Russet Burbank were planted in a field having a high population of M. hapla to determine if planting date affected the amount of tuber galling. The data (Washington table 5) show a considerable reduction in amount of galling in early-planted (March 31) Norgold Russet. Planting date had no effect with Russet Burbank.

Reaction to Rhizoctonia solani. The 27 entries in the variety trials were planted in a field that had been cropped to potato annually since 1958. Variability among entries in amount of stem infection (Washington table 6) was slight, but the cultivars varied considerably in amount of stolon infection. Since stolons with type 4 lesion are generally severed, the percentage of stolons with this type affects yield significantly. BR6316-7 had 40.9% of its stolons with type 4 lesion, yet this selection was the highest yielder (51.4 tons) in the early harvest trial. Norchip had the lowest (9.7) percentage of type 4 lesion. The seriousness of the Rhizoctonia problem is illustrated by the fact that a majority of the cultivars had a higher percentage of stolons affected with type 4 lesion than the total combined percentages of types 1, 2 and 3.

Washington table 1. August harvest variety trial, 1969.

Selection or Variety	Yield Per Acre Cwt.	Tubers			Specific Gravity	Chip ^{3/} Color
		^{1/} Number	^{2/} Scab Pct.	Hollow heart Pct.		
BR6317-21	1028	279	46	3.9	1.075	7
B5416-6	949	430	68	1.6	1.078	8
BR6376-6	928	291	64	3.8	1.081	7
Kennebec	887	283	48	4.6	1.082	6
BR6316-4	870	354	80	2.5	1.088	7
Norgold Russet	836	328	0	10.4	1.087	8
Cascade	822	354	42	0.0	1.080	7
292-5	808	247	50	9.3	1.073	7
288-1	787	445	34	0.0	1.085	6
292-4	781	262	92	1.5	1.083	6
BR6321-1	770	277	68	0.0	1.080	8
B5593-1	736	270	48	23.3	1.080	6
Norchip	736	313	6	2.9	1.092	4
Russet Burbank	735	275	0	1.6	1.086	7
292-3	712	282	42	0.3	1.086	8
BR5951-3	691	304	52	5.3	1.082	6
Lenape	664	313	68	0.0	1.105	5
292-2	615	296	86	1.0	1.088	8
BR5967-7	615	232	64	16.8	1.097	8
BR5957-7	598	283	54	1.8	1.079	6
249-2	560	348	40	0.6	1.092	6
BR6316-7	509	406	16	1.5	1.090	6
WC230-14	440	257	78	1.5	1.081	9
280-11	416	322	2	0.0	1.088	8
245-2	394	289	36	0.3	1.089	7
249-1	389	280	68	0.3	1.091	6
292-1	320	281	70	0.0	1.091	8
LSD 5%	182					
LSD 1%	246					

^{1/} Forty seed pieces planted.

^{2/} Includes tubers from slight to severe infection.

^{3/} Chipped twelfth day following harvest August 8, 1969.

Washington table 2. November harvest variety trial, 1969.

Selection or Variety	^{1/} Verticillium wilt vine symptoms		Yield Per Acre		Specific Gravity	Hollow Heart Cwt.
	8/22	9/2	Total	Over 2 Oz.		
			Cwt.	Cwt.		
BR6316-7	0.0	0.2	1080	1046	1.105	17
Cascade	2.5	4.0	914	873	1.086	0
BR6376-6	1.0	3.5	894	863	1.080	103
288-1	1.7	3.7	856	818	1.085	10
Kennebec	3.5	4.7	801	784	1.073	148
B5415-6	1.0	3.0	801	777	1.090	31
Russet Burbank	1.5	3.7	794	732	1.084	27
BR6316-4	1.2	3.2	753	708	1.080	41
292-3	1.5	3.5	677	650	1.088	3
Norchip	2.7	4.0	677	653	1.086	10
BR5951-3	3.2	4.5	670	615	1.082	31
BR5957-7	1.0	2.5	670	636	1.090	21
BR6321-1	4.0	4.0	643	622	1.073	3
Lenape	0.7	2.2	643	636	1.103	45
BR6317-21	3.7	4.5	639	608	1.074	58
292-4	3.7	5.0	629	591	1.075	7
Norgold Russet	4.2	5.0	629	584	1.077	76
249-2	1.5	3.5	615	581	1.078	()
292-5	4.0	5.0	595	574	1.071	48
292-2	2.2	4.0	574	543	1.079	0
245-2	2.5	4.0	570	501	1.088	0
292-1	1.0	2.7	557	502	1.087	0
B5593-1	3.5	5.0	550	529	1.064	148
BR5967-7	3.7	4.7	550	526	1.090	144
WC230-14	0.7	2.7	523	492	1.080	21
249-1	3.0	4.0	464	409	1.080	3
280-11	4.0	4.7	447	396	1.074	0
LSD 5%			151			
LSD 1%			204			

^{1/} 0 = None to 5 = Dead.

Washington table 3. November harvest variety trial, 1969.

Selection or Variety	<u>1/</u>	<u>2/</u>	<u>3/</u>	<u>4/</u>
	Internal Browning Pct.	Internal Black Spot Index	Chip Color	
BR6316-7	18	70	10 8	W, round to oblong, flat
Cascade	0	54	8 7	W, round to oblong, growth cracks
BR6376-6	0	73	9 8	W, round, growth cracks
288-1	2	23	7 6	W, round to oblong, growth cracks, knobs
Kennebec	0	58	7 5	W, round to oblong, flat, growth cracks, knobs
B5415-6	0	23	8 7	W, round, growth cracks
Russet Burbank	12	46	9 8	R, oblong, growth cracks, knobs
BR6316-4	4	62	8 7	R, oblong to flat
292-3	6	31	10 7	R, round to oblong, knobs
Norchip	0	94	7 6	W, round to oblong, growth cracks, knobs
BR5951-3	30	50	7 6	W, round to oblong, growth cracks
BR5957-7	0	60	7 6	W, round to oblong, growth cracks
BR6321-1	0	65	9 8	W, round to flat, growth cracks
Lenape	2	95	6 4	W, round to flat
BR6317-21	0	55	8 7	W, round to oblong, flat, growth cracks, knobs
292-4	4	69	8 6	R, oblong, knobs
Norgold Russet	2	63	8 7	R, oblong, growth cracks, knobs
249-2	0	84	8 8	R, oblong
292-5	0	30	9 9	R, round to oblong, growth cracks
292-2	0	61	10 7	W, round to oblong
245-2	12	69	9 8	R, oblong, knobs
292-1	4	24	10 8	W, oblong to flat
B5593-1	0	54	10 9	R, round to oblong, growth cracks
BR5967-7	0	69	9 8	R, round to oblong, growth cracks
WC230-14	2	65	10 10	R, oblong, growth cracks, knobs
249-1	2	60	8 7	R, oblong, knobs
280-11	2	29	8 7	R, oblong to round, small

1/ Percentage of tubers with browning from any cause.

2/ 0 = None to 120 = most severe.

3/ Directly from 50° F., and after 2 weeks at 72° F.

4/ W = white skin, R = russet skin.

Washington table 4. Reaction of selections and varieties to Meloidogyne hapla tuber galling.

Selection or Variety	Tubers		Selection or Variety	Tubers	
	Number	Percent Galled		Number	Percent Galled
292-2	70	0.0	M5908-1	84	8.3
292-4	67	0.0	249-2	95	8.4
M284-5	189	0.0	Lenape	44	9.1
B5593-1	82	0.0	BR5951-3	66	9.1
A6334-20	81	0.0	262-M	85	10.6
BR6376-6	66	0.0	BR6321-1	56	10.7
M6614-16	59	0.0	300-1	67	14.1
M6641-4	92	0.0	M6617	96	15.6
Norgold Russet	91	1.1	BR6316-7	65	20.0
A6334-19	80	1.2	273-2	81	22.2
BR5957-7	76	1.3	292-1	76	22.4
295-1	118	1.7	249-1	111	24.3
295-5	44	2.3	Cascade	94	25.5
M6617-4	80	2.5	245-2	135	26.7
280-11	90	3.3	Russet Burbank	67	40.3
Norchip	72	4.2	BR5967-7	60	41.7
BR6317-21	71	5.6	288-1	64	42.2
M6614-7	83	6.0	WC230-14	86	48.8
292-3	60	6.7	BR6316-4	78	60.2
Kennebec	56	7.1	B5415-6	58	67.2
M6617-3	82	7.3			

Washington table 5. Effect of planting date on incidence of tuber galls.

Variety	Planting Date	Total Number Tubers	Percent Galled
Norgold Russet	3/31	818	10.1
Norgold Russet	5/6	939	23.4
Russet Burbank	3/31	872	25.9
Russet Burbank	5/6	840	23.2

Washington table 6. Reaction of selections and varieties to Rhizoctonia stem and stolon infection, 1969.

Selection or Variety	Number of Stems	Stem Lesion Index	Number	Stolons				
				Percent Lesion Types ^{1/}				
				0	1	2	3	4
245-2	109	1.63	813	64.7	9.7	3.7	3.4	18.4
249-1	79	1.59	665	48.3	8.3	5.6	5.9	32.0
249-2	80	1.97	887	62.8	4.2	3.6	2.8	26.6
280-11	71	2.25	558	36.5	7.5	6.3	6.8	42.8
288-1	58	1.98	559	48.6	7.5	6.1	7.1	30.9
292-1	55	1.65	555	47.5	7.9	5.0	6.8	32.6
292-2	23	2.00	387	53.5	6.2	5.4	5.2	29.7
292-3	56	1.87	545	63.7	9.7	5.5	6.0	15.0
292-4	33	1.21	469	71.8	5.3	1.7	3.6	17.5
292-5	39	1.64	622	60.3	5.0	3.8	6.6	20.4
B5415-6	55	1.56	564	61.3	9.0	3.9	5.5	20.2
B5593-1	56	1.68	453	60.9	10.8	3.7	4.6	19.9
BR5951-3	62	1.84	837	52.1	8.9	5.5	8.1	25.3
BR5957-7	45	1.51	411	57.9	4.6	2.4	3.2	31.9
BR5967-7	46	2.26	471	64.1	6.1	5.5	5.1	19.1
BR6316-4	43	1.86	569	48.8	4.2	4.6	5.6	36.7
BR6316-7	119	1.88	1469	47.0	3.9	4.3	3.7	40.9
BR6317-21	103	1.87	859	46.4	10.5	5.6	7.1	30.4
BR6321-1	58	1.74	1207	61.5	3.8	1.8	3.3	29.5
BR6376-6	77	2.04	1034	52.7	7.5	5.0	7.9	26.8
WC230-14	83	1.44	602	55.0	10.8	8.8	5.3	20.1
Cascade	91	2.20	1272	56.2	6.3	4.3	5.7	27.4
Kennebec	48	1.14	522	68.4	8.8	3.8	4.4	14.5
Lenape	24	2.42	419	59.2	6.2	3.6	3.6	27.4
Norchip	51	1.43	431	62.6	16.7	5.6	5.3	9.7
Norgold Russet	81	2.31	477	59.3	8.0	5.2	5.2	22.2
Russet Burbank	44	2.29	440	62.0	7.0	2.9	5.2	22.7

Total	1,689	18,097
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^{1/} 0 = no infection, 4 = girdled

WASHINGTON

N. Holstad, R. Kunkel, and R. C. Holland

Results of the 1969 Potato Variety Trials

The 1969 variety trial at Othello, Washington included 71 selections with four of them yielding in excess of 50 tons per acre.

The land had been in alfalfa for six years and prior to that it was in dryland grain. In early spring the alfalfa was rotovated and 540 lb/acre of P_2O_5 and K_2O and 10 lb/acre of zinc from $ZnMnS$ were broadcast. The land was then plowed to a depth of 10-12 inches.

The seed was planted 9.3 inches apart in rows 32 inches apart on April 28. About 440 lb/acre of nitrogen from ammonium nitrate was banded two inches to the side and slightly below the seed piece at planting time. Furrow irrigation on a 5-day rotation started on May 22 and was continued with brief interruptions into September.

A randomized complete block design was used with each of the six replications consisting of a single row 17 feet long.

The Russet Burbank, Norgold Russet, White Rose and Kennebec seed was obtained from commercial sources. The seed for the other selections were grown by R. C. Holland at the Washington State Department of Agriculture Nursery at Bellingham.

Dacthal was applied at 10 lb/acre for weed control. Control of mildew, aphids, mites and early blight was on a preventative basis with WSU recommended materials.

The vines were beaten off October 15 and the tubers were harvested October 16-17.

Tests for specific gravity, hollow heart, and potato chip color are now underway.

Holstad table 1. Yield, grade and tuber description of varieties in the 1969 trials.

Variety	Yield Per Acre		Tuber Description
	Total	No. 1's	
	Cwt.	Pct.	
A 503-42	1125	88	Round, white
A 6203-4	1088	82	Oblong, red
A 6135-4	1056	87	Long, buff-russet
W 44-3A	1055	87	Long, buff
A 6207-3	990	77	Oblong, buff
B 5011-17	978	80	Round, white
A 59325-2	977	86	Long, russet
Kennebec	957	87	Oblong, white
Cascade	945	86	Oblong, white
A 180-26	921	82	Oblong, white
Wc 230-14	910	92	Long, russet
16.55-1	910	80	Oblong, buff
A 6135-4	891	87	Long, buff
Russet Burbank	continued 890	76	Long, russet

Holstad table 1 continued.

Wauseon	874	89	Round, white
A575-7	860	75	Oblong, russet
A598-3	859	73	Long, russet
A170-9	851	80	Oblong-long, russet
A6126-4	849	83	Oblong, red
Norchief	844	87	Round, red
396.55-3	839	91	Round, red
A6176-7	833	72	Oblong-round, russet
1457-3	819	91	Oblong, buff
Alamo	810	85	Oblong, white
B5089-17	803	81	Oblong, white
B5415-6	803	81	Oblong, white
A59197-5	794	83	Long-oblong, russet
77.57-1	774	88	Round, white
93.55-16	772	90	Round, buff
245-9	770	86	Long, white
A62180-2	768	82	Oblong, buff
309-50-5	747	88	Long, white
B5665-7	739	86	Long, white
ND6584-6R	737	88	Round, red
B5031-18	735	77	Round, white
245-2	734	86	Long, russet
1.57-1	702	89	Round, buff
168-3	689	85	Long, russet
Norchip	688	85	Round, white
Lenape	687	87	Round, white
B5613-1	682	84	Round, white
Norgold Russet	679	90	Long, russet
B5132-3	674	82	Round, white
Bake King	666	87	Oblong-long, buff
245-5	665	88	Long, russet
B5461-4	665	83	Round, white
ND6127-10R	645	89	Round, red
249-1	644	82	Long, red
ND6327-7 Russet	642	88	Oblong, russet
91-57-8	642	82	Oblong, buff-russet
B5090-11	635	78	Oblong, white
A5943-1	625	73	Long, russet
ND5761-5	603	80	Round, white
ND5424-4R	578	90	Round, red
ND7233-8 Russet	569	88	Long, russet
ND7196-18	558	73	Round, white
B5400-8	558	89	Round, buff
185.57-1	551	78	Oblong, buff
B5593-1	545	78	Oblong, white
B5647-9	540	80	Round, white
B5698-8	534	69	Round, white
B5701-21	519	78	Long, white
B5647-8	515	84	Round, white
B5288-5	506	81	Round, white
B5299-39	480	81	Oblong, white
ND5751-7	464	85	Oblong, buff
ND7233-2 Russet	443	78	Oblong, russet
ND7414-10R	397	76	Round, red
B5458-6	343	87	Oblong, russet
A374-3	286	44	Long, russet
B5412-10	242	75	Oblong, russet

WISCONSIN
P. R. Rowe

Genetics and Cytogenetics of the Tuber-Bearing Solanum Species
(Cooperative ARS, USDA and Wisconsin Station)

This project, cooperative between the Vegetables and Ornamentals Research Branch and the Wisconsin Agricultural Experiment Station, conducts genetic and cytogenetic investigations of the tuber-bearing Solanum species to provide information of potential value in the utilization of the wild germ plasm. The following studies received emphasis in 1969.

1. Diploid-tetraploid comparisons.

Studies into factors affecting performance at the diploid and tetraploid levels of ploidy are continuing. Data for clones and hybrid families grown at two locations for two years indicate that the level of heterozygosity was more important than ploidy level in influencing stability of performance. Diploid and tetraploid families with different levels of inbreeding also have provided evidence on the importance of relative heterozygosity.

2. Gene-chromosome relations.

Trisomics and other aneuploids have been obtained from 3X-2X crosses. These were products of interspecific crosses; and although some distinctive characteristics were noted, genetic variability appeared to mask the effects of the extra chromosome. In an attempt to avoid this complication, 8 diploid Solanum species (cardiophyllum, chacoense, jamesii, kurtzianum, pinnatisectum, tarijense, verrucosum, Stenotomum) were treated with colchicine to produce tetraploids. Doubled clones were used in intraspecific 4X-2X crosses to produce triploids to be used in intraspecific 3X-2X crosses. Hopefully, aneuploids from these crosses will more readily show the effects of extra chromosomes.

3. Inbreeding diploid potatoes.

This study has been conducted to evaluate the effects of inbreeding in diploid potatoes and to develop highly inbred clones for use in further genetic investigations. Families representing S_0 , S_1 , S_2 , S_3 and S_4 generations were grown in 1969. Inbreeding causes a significant decrease in vigor, fertility and tuber production. This decline has made it difficult to obtain adequate families of subsequent generations. It appears, however, that inbreeding depression follows theoretical expectations.

4. Studies on S. stoloniferum.

This tetraploid ($2N=4X=48$) species has several characters of potential value to potato breeding. These include immunity to A and Y virus, resistance to late blight and resistance to aphids. However, when crossed with Tbr, almost invariably hexaploid progeny are produced. Studies are underway to determine the basis of the crossing behavior of sto. Hexaploid, tetraploid and triploid clones obtained from sto x 2 X and 4X Tbr were crossed with Tbr varieties and 24-chromosome hybrids. The seed set and chromosome number of the progenies

From these combinations may provide some insight into the basis for the crossing behavior of this species.

5. Resistance to Pseudomonas solanacearum.

In a project cooperative with Luis Sequeira, Department of Plant Pathology, University of Wisconsin, the resistance to bacterial wilt found in the cultivated diploid, Phureja, has been studied under greenhouse and growth chamber conditions. Clones vary in reaction to different isolates of Pseudomonas, and host reaction is very sensitive to environmental conditions. Resistance to the pathogen appears to be controlled by few genes. Crosses have been made to combine bacterial wilt resistance with resistance to late blight.

WYOMING

K. E. Bohnenblust and G. S. Howard

Potato variety trials were planted at Powell, Torrington, and Laramie, Wyoming in 1969. Several factors combined to make the nursery at Torrington questionable and the entire experiment was discarded. The nursery at Laramie emerged very late and grew slowly because of an unusually cool spring. The season was not adequate for growth of a good crop. Growing conditions were good at Powell and nursery there was quite representative.

At Laramie the yield of Wyred was significantly higher than all other varieties. The next highest yielder was Norchip. Wyred produced 95% U.S. No. 1 tubers. Red McClure, Kennebec, Norchip, and Russet Burbank all had a specific gravity of over 1.090.

Kennebec, at 365 cwt., was the highest yielding variety at Powell, however, this was not statistically different than Red LaSoda at 327 cwt. The 86% U.S. No. 1 tubers of Red LaSoda made the yield of No. 1 tubers (280 cwt.) slightly higher than Kennebec (274 cwt.). Two different strains of Russet Burbank were included in the nursery at Powell. They were statistically different from each other in yield. The highest yielding strain produced 72% U.S. No. 1 potatoes and the second 63%. The specific gravities of Russet Burbank, Red McClure, Norchip, and Kennebec were within the range of 1.097 to 1.093.

Tuber indexing and increase of Wyred was continued at the Cheyenne Horticultural Station. A promising experimental line, from Kennebec x Teton, was also indexed and increased at Cheyenne.

Wyoming table 1. Potato variety yield trial, Laramie, 1969^{1/}

Variety	Yield Per Acre			Rank of US No. 1	Specific Gravity
	Total	US No. 1			
	Cwt	Cwt	Pct		
Wyred	145	138	95	1	1.079
Norchip	125	109	87	2	1.085
Red LaSoda	118	107	91	3	1.084
Norchief	116	97	84	5	1.092
Kennebec	114	100	87	4	1.082
Norland	107	94	88	6	1.092
Bounty	93	83	89	7	1.085
Chieftain	84	62	74	9	1.091
Superior	79	67	85	8	1.085
Red McClure	79	62	78	10	1.079
Haig	64	46	72	13	1.084
Russet Burbank	64	50	79	11	1.095
Norgold	59	46	79	12	1.080
Oromonte	43	26	62	14	1.084
General Mean	92	78	82		
LSD	18	13			

^{1/} Date planted -- May 30. Planted in 1-row plots, 40 ft. long,
Rows spaced 36 inches apart in 4 randomized blocks.
with hills 12" apart. Date harvested -- October 2.
Date tubers were graded--Oct. 14 Previous crop -- Barley
Minimum size of US No. 1 tubers -- 1 7/8 inches.
Date specific gravity was obtained -- November 6.

Wyoming table 2. Potato variety yield trial, Powell, 1969^{1/}

Variety	Yield Per Acre			Rank of US No. 1	Specific Gravity
	Total	US No. 1			
	Cwt	Cwt	Pct		
Kennebec	365	274	75	2	1.093
Red LaSoda	327	280	86	1	1.085
Russet Burbank (a)	308	223	72	9	1.097
Wyred	301	261	87	3	1.080
Bounty	299	261	87	3	1.085
Haig	294	261	89	3	1.087
Superior	289	239	83	6	1.089
Chieftain	278	219	79	10	1.086
Norchip	265	227	86	7	1.096
Red McClure	263	216	82	11	1.097
Russet Burbank (b)	258	162	63	14	1.096
Norgold	252	225	89	8	1.084
Oromonte	245	203	83	12	1.089
Norland	221	203	92	12	1.082
General Mean	283	232	82		1.089
LSD	40	35			

^{1/} Date planted --
Planted in 1-row plots, 20 ft. long, in 4 randomized blocks.
Rows spaced 36 inches apart, with hills 12 inches apart.
Date harvested -- September 29. Previous crop -- Sugar beets
Date tubers were graded -- October 23.
Minimum size of US No. 1 tubers -- 1 7/8 inches.
Date specific gravity was obtained -- October 24.



